Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico..... **$5.00**
Canada **6.00**
Foreign Countries (excepting daily editions)..... **8.00**
Single copies.....**15 cents each**

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE that of this issue 8,700 copies were printed; that of these 8,700 copies 7,207 were mailed to regular paid subscribers to the weekly edition, 131 were provided for counter and news companies' sales, 1,054 were mailed to advertisers, exchanges and correspondents and 308 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 385,750, an average of 9,185 copies a week.

THE RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

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An editorial on the licensing of structural engineers in Illinois, in the *Railway Age Gazette* of September 10, called attention to the fact that the law provides for the granting of licenses to engineers from other states in which similar laws are in effect, and stated further that no such law has been passed by any other state.

The Licensing of Engineers

A. A. Woods, superintendent on the Queen & Crescent, calls attention to the fact that the state of Louisiana passed a law in 1908, requiring a license for the practice of civil engineering and surveying. This statute does not define the terms "civil engineering" or "surveying," nor does it state what is to be understood as constituting the "practice" of these professions. The fact that the candidates for licenses in civil engineering are to be examined only in "natural philosophy or physics," in addition to the branches mentioned for surveyors, throws no further light on the subject other than to indicate unlimited discretion on the part of the board of examiners. It is not known what attitude will be taken by the Illinois board concerning the holders of licenses in Louisiana. This example illustrates the variety of conditions to which the railroads crossing state lines would be subjected, if other states should follow the example of Illinois and Louisiana.

The British Board of Trade report of the returns of the railways of the United Kingdom for the calendar year 1914 is contained in a single page, which is published elsewhere in this issue. Only a few of the most important figures, such as those for mileage, capitalization, earnings and expenditures are given, in place of the usual volume of statistics comprising 100 or more pages, and it is announced that, in consequence of the war, no further returns will be published for the year. Total revenues amounted to $677,731,860, including the estimated amount receivable under the government's guaranty, given when it took control of the roads for military purposes on August 5, of compensation for any decrease in net receipts for the period during which the government retained possession of them, as compared with the corresponding period of the previous year. The gross earnings were $1,715,000 less than in 1913, but approximately $50,000,000 more than in 1912. Expenses, on the other hand, increased $4,145,000, so that the net income was $5,861,000 less than in 1913, but almost $18,000,000 more than in 1912. Some indication of the volume of traffic is afforded by the train mileage figures, which show a decrease of 5,518,000 miles as compared with 1913, most of which was in freight, although there was a large increase over previous years with the exception of 1913. Under the exigencies of military traffic, however, these figures probably include a large empty mileage. The ratio of expenses to revenues was 63.3, in 1914, against 62.6, in 1913, and the percentage of net income to paid-up capital was 3.79, in 1914, against 3.90, in 1913. The total paid-up capital in 1914 amounted to $6,518,338,920, or $275,000 a mile, an increase for the year of about $35,045,000, while the main line mileage during the year increased only 10 miles to 23,701, and the mileage of single track increased 258 miles.

British Railway Returns

The constitutional convention of New York state, which has recently adjourned, submits to the people an amendment which, if adopted, will make the public service commissionerships constitutional offices; in other words, partisan legislatures cannot abolish the commissions on the whim of a moment. As everybody is agreed that "regulation has come to stay," this is a salutary change. The proposed amendment leaves the powers of removal and appointment just as they are now; the members' terms of office, five years, remain unchanged, and the objections to the amendment, voiced in some newspapers, based on the argument that the reasonable powers of the legislature and the governor will be curtailed, is groundless. It will be remembered that these two commissions were created in Governor Hughes' time one to have supervision over the public utilities of New York City, the other over the public utilities of the rest of the state. The commissioners are appointed by the governor; the salary is $15,000 a year, and the original idea was to get the best men available regardless of political affiliations. This ideal, however, has not been lived up to, and for the last few years the commissionerships have been considered political plums at the disposal of the governor. This bad condition is little improved. The responsibility of a governor, in making appointments like these, is akin to that of the President in appointing judges for the federal courts, but only rarely do the citizens of New York elect a governor who appreciates this. If governors would

New York's Public Service Commissions

make appointments to commissions from men best fitted to hold such positions and not as rewards for political support, then truly government regulation would have an opportunity which it seldom has had in this country. It might be the very legitimate ambition of a railroad man, a professor of economics, or an engineer, to step from competitive work into the judicial-administrative capacity of public service commissioner. While the salary would not be comparable to that of the vice-president of a large railroad or to the earnings of a successful engineer, it would carry a dignity, a responsibility and an authority in somewhat the same way that an appointment to the Supreme Court does; and that ought to go far toward making up for money loss.

RAILROAD BANKRUPTCY

A SIXTH of the mileage of all the railroads in the United States is being operated by receivers and 66 per cent of all the roads in receivers' hands is in the Southwest. There is only approximately 32 per cent of the railroad mileage for the entire United States shown in the accompanying map, which covers the Southwest and some additional territory, while 66 per cent, or nearly 28,000 miles out of the total of approximately 42,000 miles of road that are in receivers' hands, is shown on this map.

The following is a list of all the roads now being operated by receivers:

RECEIVERSHIPS JANUARY 1, 1915

	Miles	Outstanding Stock	Total Funded Debt
Apalachicola Northern	102	3,000,000	2,000,000
Arkansas, Louisiana & Gulf	61	1,230,100	1,230,000
Arkansas Southeastern	30	500,000	500,000
Atlanta, Birm. & Atlantic	645	35,000,000	18,533,000
Beaumont, Sour Lake & West.	118	85,000	2,007,251
Birm., Columbus & St. Andrews	38	4,500,000	250,000
Boyne City, Gaylord & Alpena	90	501,200	175,000
Buffalo & Susquehanna	91	10,000,000	7,059,000
Cape Girardeau Northern	104	110,000	1,500,000
Chicago & Eastern Illinois	1,282	25,817,800	63,155,000
Chicago, Anamosa & Northern	36	112,000	(Not Pub.)
Chicago, Peoria & St. Louis	245	4,000,000	2,000,000
Cincinnati, Bluffton & Chic.	52	1,125,000	1,500,000
Cincinnati, Hamilton & Dayton	1,015	8,248,575	62,135,640
Colorado Midland	338	10,000,000	9,532,000
Columbus & Southern	23	2,000,000	500,000
Dansville & Mt. Morris	15	50,000	150,000
Denver, Laramie & No.-Western	56	29,072,800	1,500,000
Fitzgerald, Ocilla & Broxton	23	300,000	150,000
Florida, Alabama & Gulf	25	.....	.....
Florida Central	47	50,000	500,000
Ft. Worth & Rio Grande	235	(See St. L. & S. F.)	
Gould Southwestern	25	51,000	.....
Greenville & Knoxville	23	260,000	460,000
International & Great Northern	1,106	4,822,000	24,594,500
Iowa & Omaha Short Line	14	.....	175,000
Kane & Elk	15	75,000	9,000
Kansas City & Memphis	58	852,000	796,000
Kansas, Southern & Gulf	10	1,000,000	.....
Liberty White	50	300,000	250,000
Louisiana & Northwest	121	2,300,000	2,180,000
McCrory & Beedeville So.	12	.....	.....
Macon & Birmingham	97	500,000	500,000
Marietta, Columbus & Cleveland	49	250,000	250,000
Missouri & North Arkansas	365	8,340,000	8,340,000
Missouri, Oklahoma & Gulf	329	8,261,000	8,261,000
Muscatine North & South	54	1,000,000	890,000
New Berlin & Winfield	8	30,000	33,800
New Orleans, Mobile & Chic.	402	8,075,300	12,699,500
New Orleans, Texas & Mexico	287	(See St. L. & S. F.)	
Ocala Northern	54	.....	.....
Ohio & Kentucky	40	300,000	425,000
Ohio River & Columbus	24	501,000	85,000
Opelousas, Gulf & Northeastern	57	1,421,475	1,143,000
Orange & Northwestern	62	(See St. L. & S. F.)	
Pere Marquette	2,322	26,186,590	63,672,000
Pittsburgh, Shawmut & Northern	291	15,000,000	14,655,600
Rome & Northern	20	1,000,000	.....
St. Louis & San Francisco	4,747	41,985,762	295,499,358
St. Louis, Brownsville & Mex.	528	(See St. L. & S. F.)	
St. Louis, San Frans. & Texas	242	.....	.....
Salt Lake & Mecur	14	300,000	250,000
San Ant., Fred. & Northern	25	.....	.....
San Antonio, Uvalde & Gulf	316	230,000	3,663,000
Sharpsville	21	350,000	.....
Tennessee Ry.	54	1,000,000	1,129,000
Tennessee Central	293	7,941,450	12,379,900
Texas Mexican	161	2,500,000	1,380,000
Toledo, St. Louis & Western	450	19,947,600	28,027,000
Trinity & Brazos Valley	303	304,000	8,760,000
Valdosta, Moultrie & Western	42	100,000	300,000
Virginia & Kentucky	5	119,100	35,500
Wabash	2,514	92,801,986	115,156,496
Wabash, Chester & Western	65	1,250,000	690,000
Wabash, Pittsburgh Terminal	63	10,000,000	30,236,000
West Side Belt R. R.	22	1,080,000	383,000
Wheeling & Lake Erie	459	36,980,000	15,000,000
Williamsville, Greenville & St. L.	35	525,000	525,000
Wisconsin & Michigan	123	956,000	3,518,245
Total, January 1, 1915	21,048	$434,599,738	$830,728,790

RECEIVERSHIPS SINCE JANUARY 1, 1915

	Miles	Outstanding Stock	Total Funded Debt
Algoma Cent. & Hudson Bay	332	$10,000,000	$10,080,000
Atlantic Northern	17	150,000	100,000
Boca & Loyalton	55	1,200,000	418,000
Chic., Rock Island & Pacific	7,847	74,877,200	215,255,000
Crooked Creek R. R. & Coal Co.	18	112,500	112,500
Florida Ry.	59	1,166,000	1,189,965
Georgia & Florida	350	8,750,000	8,452,000
Inverness Ry. & Coal Co.	61	7,500,000	2,131,000
Kansas City, Ozark & Southern	15	.....	.....
Missouri, Kansas & Texas	3,865	76,300,300	120,073,000
Missouri Pacific	7,285	83,251,085	161,910,500
Pacific & Idaho Northern	90	2,929,800	1,816,000
Western Pacific	946	87,779,800	123,119,000
Total since January 1, 1915	20,940	$354,016,685	$644,656,965
Total, January 1, 1915	21,048	$434,599,738	$830,728,790
Total since January 1, 1915	20,940	354,016,685	644,656,965
	41,988	$788,616,423	$1,475,385,755

Total Mileage, 41,988; Total Capitalization, $2,264,002,178

It will be noted that the only roads of any importance that are in receivers' hands and are not at least in part on the map of the Southwest are the Western Pacific, operating 946 miles; the Colorado Midland, operating 338; the Georgia & Florida, operating 350, and the Algoma Central & Hudson Bay, operating 332 miles. A part of the Pere Marquette is shown on the map, but most of it is not.

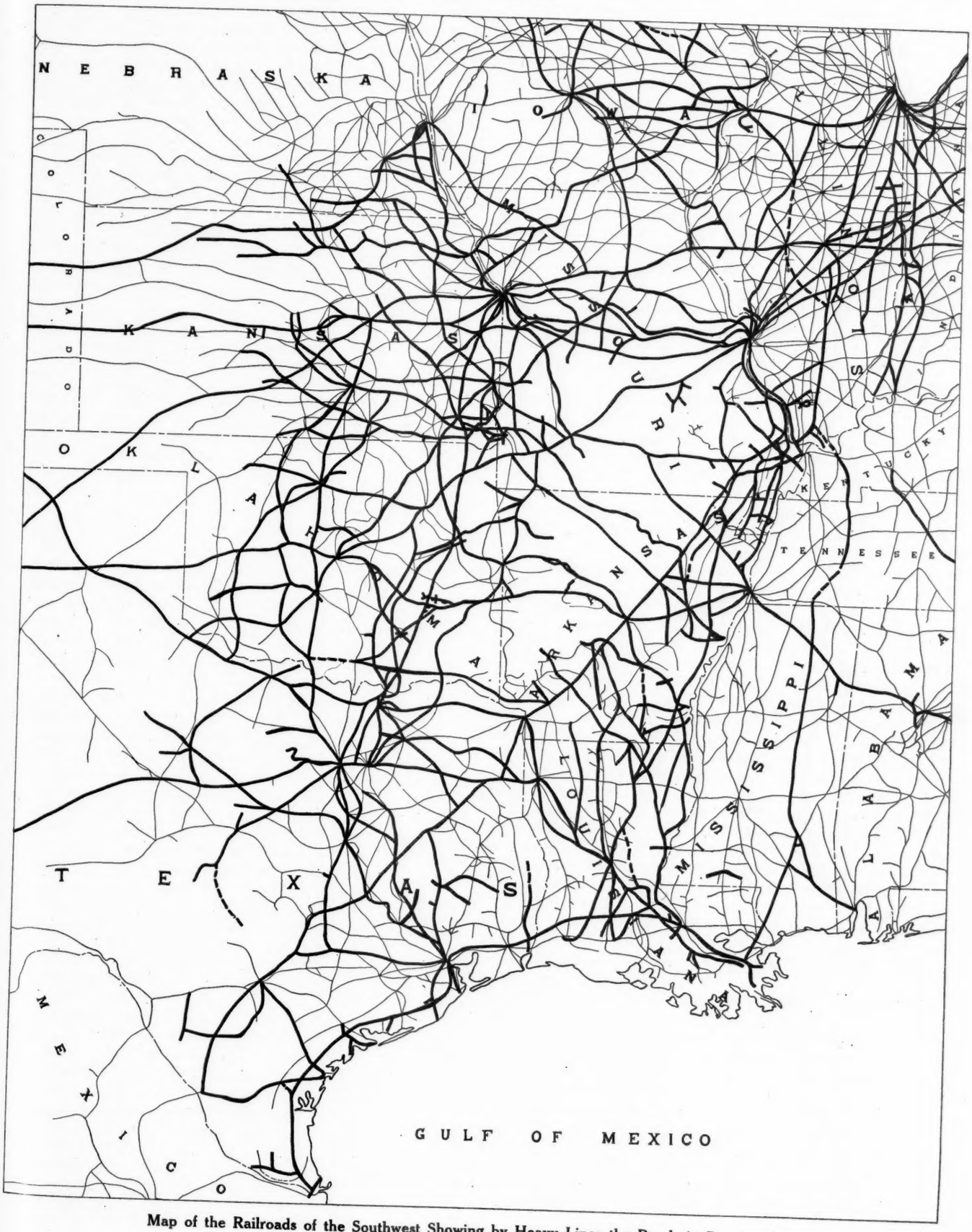
With the problem before bankers and railroad managements, of restoring the bankrupt railroads to a condition of solvency, it becomes essential that the conditions which brought about bankruptcy should be studied and analyzed in a spirit of entire candor. A successful termination of the conditions which now exist can be arrived at only if the causes which brought about these receiverships are removed. It is believed that a study of the accompanying map will help in this analysis.

If the roads which are in the hands of receivers and are not shown on this map have certain features in common with the southwestern roads, this might be some clue to the facts which we are trying to get at. The condition of the Western Pacific doubtless is due mainly to the fact that it is a new road in a territory which is largely undeveloped. That might be said of certain individual lines of some of the southwestern roads that are in the hands of receivers, but it is obviously not a characteristic of all the roads, or of any appreciable portion of them. The Perre Marquette, only a very small part of which is shown on the map, lies largely in Michigan. Its bankruptcy was due in part to the fact that when the company was reorganized following a previous bankruptcy the reorganization was not drastic enough; that means that the earning power of the company was overestimated. Competitive conditions may have something to do with this, but the most important factor is the restrictions which are placed on rates by the state of Michigan. The Pere Marquette also has too large a proportion of funded debt to stock. The roads in the hands of receivers in the Southwest all have the last two characteristics. They have been the victims of pernicious state regulation and they all have too large a proportion of their capital securities in the form of bonds or fixed interest-bearing notes. The southwestern states have indulged in railway regulation to a greater extent than any other three states in the union. It is unlawful to double-head a freight train in Texas so as to obtain the economies of heavier trainloading. This is only one instance of state regulation, but it is mentioned as a sample of the length to which the southwestern states have gone in attempting to cripple the earning power of their railroads.

A factor which has been much commented on in connection with the receiverships in the Southwest has been the refusal of the bankers to renew maturing obligations. In some instances this may have been due to enforced conservatism on the part of the bankers, but in other instances it is not true. Take the case of the Missouri Pacific. Kuhn, Loeb & Co. stood ready to give the strongest kind of financial support, but smallness of the earning power of the road necessitated so drastic a reduction in fixed charges that security holders could only be compelled

to make the sacrifice through the medium of railway receivership.

No one can study the history of the roads of Texas with an open mind and not come to the conclusion that state regulation, as it has been practiced in the past there, is directly responsible for the failure of any Texas road to be profitable to its owners. No one can study with an open mind the laws of Missouri, Oklahoma and Arkansas and not be convinced that state restrictions on railroad operation have been one of the principal causes of the conditions which now exist in the southwestern states.



Map of the Railroads of the Southwest Showing by Heavy Lines the Roads in Receivership

If the Southwest had been experiencing a long period of business depression, if there had been crop failures, if a city like Dallas had had a boom and it had gone flat and this had been characteristic of other cities throughout this region; if prices for agricultural products had been abnormally low, we might assign any one of these as a prime cause of the disproportionate railroad mileage in the hands of receivers in the Southwest; but no one of these conditions has existed. The farmers have been growing rich; real estate values in the cities have increased phenomenally; building has been going on in the Southwest even when the East was in a state of stagnation; prices for agricultural products have been high and steady, with the exception, of course, of cotton; the railroad business is the only business, barring lumber, that has gone from bad to worse in the Southwest.

Is it any wonder, therefore, that bankers are reluctant to put new capital into the railroads of this section of the country? Let each man who has a savings bank account or a life insurance policy ask himself whether he really hopes that part of the assets of his savings bank or life insurance company is invested in southwestern railroad securities. Would the trustee of an estate be justified in buying southwestern railroad bonds? These questions are quite vital. It is not a matter of speculation as to the future; it is a matter of an unbiased study of the past.

The Southwest is not so amply supplied with railroads that there need be no new railroads built to develop the country; but who would have the temerity to try to promote a new road on the face of the accompanying map? But more immediate than this question is that of who will have the courage to underwrite a reorganization of the companies now in the hands of receivers.

Too large a proportion of fixed charges has been an important factor in all of the southwestern receiverships. To induce bondholders to accept stock in payment for their claims it will be necessary to give this stock a fair prospect of earning a substantial return, 7 per cent at least in average years, and a prospect of having very much more than this in prosperous years so as to offset the certainty that it will have to forego profits in years of bad crops or a business depression. If you are to reduce the fixed charges by persuading part of the debtors of the company to become owners with the business risks that ownership must assume, you have got to hold out prospects of business profits which are higher than would be the interest ordinarily demanded by a lender on security. All the unbounded optimism that is to be found in Oklahoma and Texas cannot persuade an investor that a southwestern railroad company's securities look good unless there is some substantial assurance that the railroads as well as other forms of industry are to be allowed to participate in the prosperity of that country. Optimism, even enthusiasm, over the Southwest is justified, but it is obvious that the railroads have not heretofore gotten their share of the wealth which they have been such an important factor in creating.

While the Southwest is worse than the rest of the country in regard to its railroad situation, figures for the entire United States make a far from good showing. Making a rough estimate based on the net operating income as shown by the figures compiled by the Bureau of Railway Economics for the fiscal year ended June 30, 1915, and taking the capitalization of the railroad companies at the beginning of that fiscal year, the net operating income of only between 40,000 and 45,000 miles of road will apparently show 6 per cent or more on the total face value of outstanding securities. In other words, the mileage of railroads which are earning 6 per cent or better on the total of their securities is only about as great as the mileage of railroads which are bankrupt. Six per cent is not a sufficient return to hold out to an investor to induce him to subscribe for stock, and yet nearly five-sixths of the mileage of railroads in the United States will not show 6 per cent in 1915, according to our estimates.

"HEALTHY RIVALRY AND STRIVING"

THE order of the Interstate Commerce Commission requiring the railways to dispose of their boat lines on the Great Lakes is having an effect very different from that anticipated by Congress when it passed the law under which the commission's order was issued, and by the commission itself when it made its decision. The law (the Panama Canal Act) provided that if the commission considered that any water service other than through the canal which was being rendered by railways "is being operated in the interest of the public and is of advantage to the convenience and commerce of the people," it might extend indefinitely the time during which the railways might continue to render it.

The commission, in its opinion on May 7, 1915, which was written by Chairman McChord, held, in effect, that the service being rendered by the lake boats owned by railways was not in the interest of the public. It said, "On a water course where boats and boat lines are free from domination or control by the railroads, and where they are left to survive as their merit or the ingenuity of their owners makes possible, there will be, and always is, a healthy rivalry and striving between such boat lines and with paralleling railroads for all suitable and available traffic. * * * The condition is one which results in the beneficial use of the waterways accruing to the shippers."

Thus confident was the commission in the expression of its views, although there were facts on every hand to contradict them. Now it is found that instead of promoting competition between the lake lines and the rail lines, the order has thus far resulted only in curtailment of boat line service and higher water rates; and a still further curtailment will result after December 15, the date on which the railroads are required to cease operating boat lines on the lakes. Several of the boats already disposed of by the roads are to be taken out of the lake service entirely, and, so far as is known, no independent service is forthcoming to take their place.

That the divorce of the lake and rail line does not present a pleasing prospect to the shippers is indicated by the petition which the Chicago Board of Trade, probably the most important organization of shippers interested in lake transportation, has just filed with the Interstate Commerce Commission, asking for permission to intervene in the rehearing asked by the Lehigh Valley and for a postponement of the order until the commission shall have heard further evidence on behalf of the shippers. The Board of Trade has also asked similar organizations in other cities to join it in seeking a postponement of the order until they can present their reasons for desiring a continuance of the boat service by the railways.

The Board of Trade says in its petition that for many years, "there has been for the most part, adequate facilities in the way of boats" for shipments from Chicago to Buffalo and other lake ports; that "the rates have been regulated largely by the supply and demand for transportation," but that the disposal by the railroads of their interest in a number of boats "has had the effect of decreasing the supply of said boats and enormously advancing the charges for transportation of grain via water," and that "the disruption and curtailment of said means of water transportation will be destructive of the business of and highly injurious to many cities and towns." "Unless immediate action is taken," the letter to other organizations says, "the shippers will either have no boat line service at all, or an irregular and unsatisfactory service, with perhaps rates no lower, and possibly higher than are being paid at the present time. The result will be an increased cost to the consumers, producers and shippers."

For many years a great majority of the service on the lakes has been rendered by vessels owned by large industrial corporations and handling only their freight, and by boat lines controlled by the railways. The amount of service rendered by so-called "independent" lines—that is, lines owned neither by the big industrial corporations nor by the railways—has been extremely small. In other words, the service to the public has

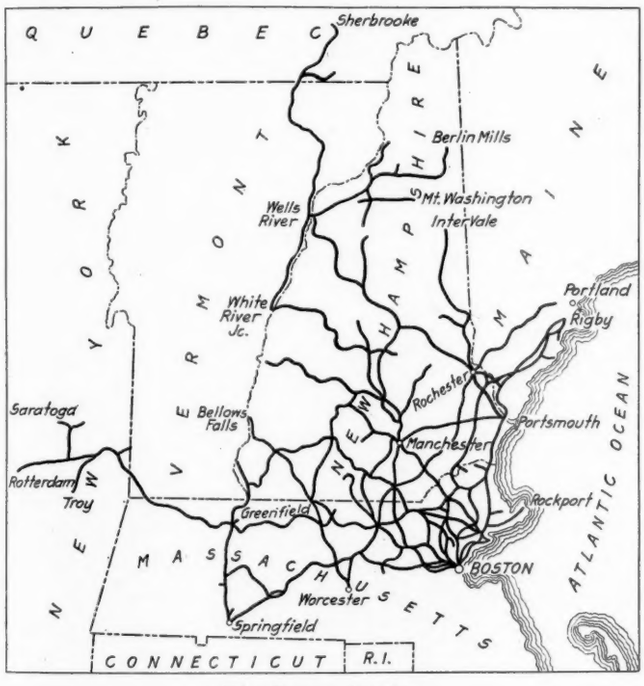
been rendered almost solely by railway boat lines. It has been assumed by many that if the competition of railroad boats were withdrawn there would at once spring up independent lines to render adequate service. But, as already indicated, the independent boat lines are no more forthcoming than is sufficient good service on our improved rivers and other inland waterways.

The reason why this is the case is that every good business man who seriously investigates the subject soon becomes convinced that an independent boat line on an inland waterway cannot oridinarily compete with the paralleling railroads in soliciting traffic and rendering satisfactory service in handling it. Perhaps this fact, which long has been patent to many of those who have studied the relations between rail and water transportation in this and other countries, will now be brought home by the hard logic of experience to those in high places who sometimes regulate first, and find out afterward the conditions to which the regulation is to be applied.

BOSTON & MAINE

EVERY officer and every employee of the Boston & Maine ought to read at least so much of the company's annual report as is contained in the last two paragraphs of the president's remarks. President Hustis says:

"No business, much less one performing public service, can



The Boston & Maine

produce its best results while doubt or uncertainty as to its future exists. Despite such a condition there is encouragement in the fact that there has been an improvement in the service as well as in the net results of operation.

"The helpful attitude of the public and the press generally, and the loyalty and faithful service of officers and employees, have contributed to and made these results possible. It is, therefore, in no perfunctory spirit that the board expresses its appreciation."

Throughout the report there is a note, not exactly of optimism, but of confidence to meet whatever difficulties the future may have in store, that is better than optimism.

The Boston & Maine operates 2,252 miles of steam railroad, of which but 707 miles is owned and the remaining 1,545 miles is leased. The majority of the Boston & Maine $42,655,000 stock was owned by the New York, New Haven & Hartford through the medium of the Boston Railroad Holding Company. This stock is now deposited with a board of trustees approved of by the United States courts in accordance with the settlement of the anti-trust suit brought against the New York, New Haven & Hartford.

There are three principal problems for which the Boston & Maine management has to find a solution. The company had at the beginning of the fiscal year which ended June 30, 1915, $24,310,000 floating debt in the form of notes, all of which were due on or before March 2, 1915. The company's interest charges on its funded debt amount to $1,755,000 and on its unfunded debt to $1,272,000. In addition to this, however, the leases of the lines which it operates but does not own call for $5,589,000 annually. The fixed charge, therefore, on the leased roads is at the rate of $3,600 per mile, which is more than can be earned under present conditions with any margin of safety. Most of the leases run for very long terms and the only way in which the rentals can be decreased is through some compromise between the Boston & Maine and stockholders of the leased lines. A part of this problem is in the laws of the New England states in which the road operates, which, as at present on the statute books, make a voluntary reorganization impossible. The third problem is the profitable operation of the railroad.

The management was able to persuade the holders of the great majority of the notes representing floating debt to extend these notes not only once, but twice, and as the situation now stands there are $17,337,000 notes outstanding, which amount will be further reduced to $13,500,000 under the plan which the noteholders have accepted of receiving a part of what is due them in Maine Railway Companies' notes, but which $13,500,000 will fall due March 2, 1916.

The legislation necessary to permit a reorganization of the company was secured in Maine and Massachusetts, but not in Vermont or New Hampshire. The management is hopeful, however, that a way will yet be found to keep the property intact. The plans to accomplish this presumably call for some sacrifices on the part of the stockholders of the leased roads, but it is hoped that these stockholders will agree to share something of the burden which must be borne by the other Boston & Maine security holders.

A very good start has been made in the operating problem, notwithstanding the fact that 1915 was a year of business depression in New England. Total operating revenues of the Boston & Maine amounted to $46,673,000 in the fiscal year ended June 30, 1915, a decrease as compared with the previous year of 3.09 per cent. The falling off in revenue was equally distributed between freight and passenger service. Total operating expenses amounted to $35,910,000, a decrease as compared with the previous year of 7.58 per cent. The operating ratio was reduced from 80.68 in 1914 to 76.94 in 1915. The company failed by only $334,000 of earning a net sufficient to meet its interest charges and rentals. In 1914 there was a deficit of $2,045,000. The saving in expenses was made through a reduction of 14.54 per cent in maintenance of equipment expenses and 9.99 per cent in transportation expenses. Maintenance of equipment cost $6,695,000 in 1915. Repairs per locomotive mile cost 8.51 cents. This was a reduction of 6.79 per cent as compared with the previous year. The repairs of freight cars cost $2,457,000 in 1915, a decrease of $534,000. It is safe to say that nearly if not all of the reduction in maintenance of equipment expenses was due to the more economical performance of the work, the same or higher standards of repairs being held to in 1915. The fact that the Billerica shops of the Boston & Maine were in operation during all of the 1915 fiscal year and only part of the 1914 fiscal year is one factor that made the saving in maintenance of equipment expenses possible; and the other was better and more economical work done by the mechanical department.

Transportation expenses amounted to $20,178,000, a decrease as compared with the previous year of $2,240,000, or about 10 per cent. The ton mileage of revenue freight carried totaled 2,416,000,000, a decrease of 8.30 per cent, and the total number of passengers carried was 43,472,000, a decrease as compared with the previous year of 7.57 per cent. The average trainload

of revenue freight was 333 tons in 1915, an increase as compared with the previous year of 19.06 per cent. All of this increase in trainloading was due to heavier tonnage pulled behind the drawbar, the mileage of loaded cars being 153,000,000, a decrease of 7.92 per cent as compared with the previous year, while the mileage of empty cars amounted to 58,000,000, an increase of 1.63 per cent.

The principal savings in transportation expenses were in fuel for train locomotives, which cost $3,644,000 in 1915, or $587,000 less than in the previous year; a decrease in the wages of yard conductors and brakemen, which cost $1,096,000 in 1915, or $210,000 less than in the previous year; and reductions in the amounts paid for station employees, fuel for yard locomotives, train enginemen and trainmen.

One specific economy which has been effected deserves mention. The amount of materials and supplies on hand was reduced from $5,702,000 in 1914 to $4,139,000 in 1915. This result was obtained through the establishment of a stores department and the vesting of this department with the necessary authority and responsibility.

The following table shows the principal figures for operation in 1915 as compared with 1914:

	1915	1914
Average mileage operated	2,252	2,252
Freight revenue	$27,042,879	$27,912,397
Passenger revenue	15,502,197	16,111,548
Total operating revenues	46,673,049	48,160,286
Maint. of way and structures	7,195,081	6,700,913
Maintenance of equipment	6,695,420	7,835,146
Traffic expenses	443,690	466,600
Transportation expenses	20,193,692	22,434,904
Miscellaneous expenses	200,170	248,878
General expenses	181,720	1,169,778
Total operating expenses	35,909,772	38,856,319
Taxes	1,978,223	2,059,017
Operating income	8,779,110	7,245,050
Gross income	9,983,584	9,151,645
Net loss	334,462	2,044,742

ATCHISON, TOPEKA & SANTA FE

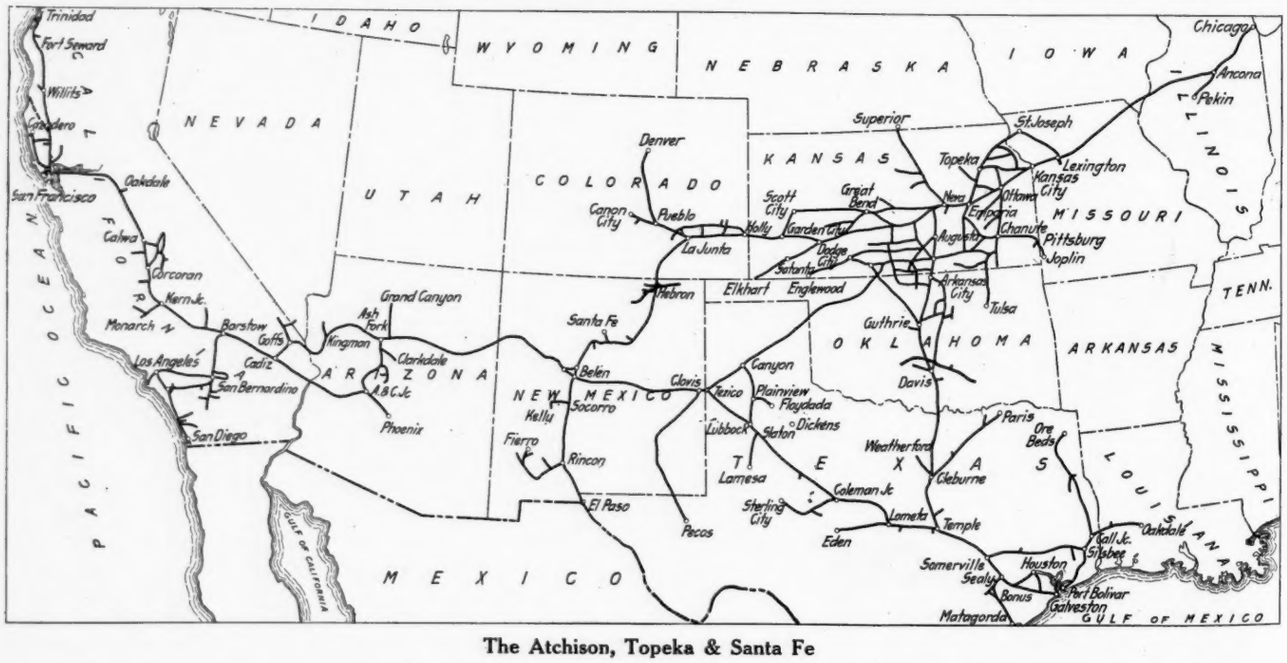
THE tonnage of agricultural products carried by the Atchison, Topeka & Santa Fe in 1915 was 6,932,000 and formed 26.57 per cent of the total tonnage of revenue freight carried, comparing with 5,000,000 tons of agricultural products carried in 1914, which formed 19.97 per cent of the total tonnage carried in that year. The average length of haul of all freight in 1915 was 317 miles as against 292 miles the year before. The fact that the wheat crop of Kansas was the largest in the history of the state and that the yield of nearly all classes of agricultural products in western Texas and western Oklahoma was phenomenal, and also that the Kansas and Oklahoma wheat was largely exported through Galveston, giving the Santa Fe the longest possible haul, combined to make both the gross and net earnings of the company the largest in its history.

The Atchison, Topeka & Santa Fe operates 11,136 miles of railroad. While it has a large mileage in the Southwest, unlike some of the other large roads which serve that territory, it has a very profitable through business and a very profitable business in California. The development of the property has been conservative, but remarkably good judgment has been shown and no time has been wasted in getting into new territory which was being developed.

In the fiscal year ended June 30, 1915, the company earned $117,666,000 from operation, an increase as compared with the previous year of $6,556,000. Operating expenses amounted to $76,092,000, an increase of $2,622,000. This gave the company an operating ratio of 64.67 in 1915 as against 66.12 in 1914. The business handled increased in greater proportion than the revenue. The total ton mileage of revenue freight was 8,263,000,000 as against 7,316,000,000. The average revenue per ton per mile was 9.47 mills as against 10.07 mills the year before. The number of passengers carried one mile was 1,342,000,000, as compared with 1,310,000,000 the year before. The average revenue per passenger per mile was 2.074 cents as against 2.175 cents in the previous year.

This increase of 12.33 per cent in freight business and 2.41 per cent in passenger business was handled with an increase in transportation expenses of approximately 2½ per cent. The average total trainload of freight was 442 tons in 1915, an increase as compared with the previous year of 5.13 per cent. The success in holding down transportation expenses is all the more noteworthy in view of the fact that the Santa Fe was very liberal in putting on additional passenger service, the passenger train mileage being increased by 4.98 per cent to accommodate the increase of 2.41 per cent in passenger mileage.

The Panama-Pacific Exposition created some traffic, which, however, was probably offset to a considerable extent by economies in traveling expenses of people affected by the business depression in the East. Much of the Panama-Pacific Exposition business is done at excursion rates, which leave small margin for profit.



The Atchison, Topeka & Santa Fe

In connection with passenger business special mention should be made of the new union passenger station at Kansas City, which was opened on November 1, 1914. President Ripley says

of this: "The new facilities constitute one of the largest and most complete passenger terminals in the country and represent a very large investment. The heavy fixed charge which this investment entails and the maintenance and operation of these extensive facilities place a large expense upon the Kansas City railroads, all of whom are using the new station; however, the new facilities are a great accommodation to the public and, of course, materially improve operating conditions at Kansas City."

The Santa Fe is liberal in its expenditures for maintenance. In 1915, $16,514,000 was spent for maintenance of way, an increase compared with the previous year of $1,089,000. This is at the rate of $1,486 per mile of road as compared with $1,403 the year before. There was spent on maintenance of equipment $19,765,000, an increase as compared with the previous year of $551,000. In addition to this ample maintenance expenditure, the company spent $12,041,000 for additions and betterments to its property and its equipment. Of this, $4,248,000 was for construction or acquisition of new lines, $5,116,000 for additions and betterments to fixed property, and $2,464,000 for additions to equipment.

Furthermore, the Santa Fe has been very liberal in its charges for depreciation on equipment. The amount accrued on this account, after charging out the depreciation on equipment destroyed, is now $23,953,000.

The Atchison is one of the soundest railroad companies financially in the entire United States. Its policy of making additions and betterments from income has been farsighted, the stockholders having taken only a part of the profits which belong to them and have invested a considerable proportion of the remainder each year in betterments. Of the total face value of securities outstanding less than half is funded debt, the funded debt at the end of 1915 amounting to $310,975,000, and the stock to $314,663,000. With an expenditure of more than $12,000,000 in 1915 on property account, there was a decrease in the amount of funded debt outstanding of $2,218,000 and an increase in stock outstanding, due to the conversion of convertible bonds into stock, of $4,678,000.

The Atchison, Topeka & Santa Fe is pre-eminently a road belonging to investors. No single financial interest controls the company and its policy is dictated by the efforts of the management to conduct the company's affairs in the interests of its security holders, large and small. Notwithstanding all the facts and circumstances in the company's favor, the rate of return earned on property investment was but 5.40 per cent in 1915; and, as President Ripley points out, the fact that the company is able to pay a 6 per cent dividend on its common stock is only because it pays slightly more than 4 per cent on its funded debt. When the governments of England and France are offering their notes at a better than 5 per cent basis, there does not appear to be any immediate possibility of any railroad company, no matter how strong, being able to sell new bonds on a 4 per cent basis.

Is it any wonder that President Ripley is a pessimist on the railroad situation in general and an optimist on Atchison? This year's Atchison annual report is both good reading to Atchison security holders and a warning so plain as to be unmistakable in regard to the railroad situation in general and, of course, especially to roads west of Chicago.

The principal figures for operation in 1915 and 1914 were:

	1915	1914
Average mileage operated	11,115	10,909
Freight revenue	$80,504,393	$73,638,388
Passenger revenue	27,823,064	28,497,233
Total operating revenues	117,665,587	111,109,770
Maintenance of way and structures	16,514,468	15,425,730
Maintenance of equipment	19,764,535	19,213,343
Traffic expenses	2,649,175	2,521,774
Transportation expenses	34,827,705	33,899,108
General expenses	2,476,595	2,409,379
Total operating expenses	76,091,554	73,469,334
Taxes	5,497,317	5,525,585
Operating income	36,051,401	32,114,851
Gross income	39,048,551	34,289,204
Net income	24,130,892	20,183,965
Dividends	17,550,017	17,400,440
Appropriated for additions and betterments	6,513,397	2,719,318

NEW BOOKS

Official Handbook of the Panama Canal. 58 pages. 6 in. by 9 in. Illustrated. Published by Government Printing Office, Washington, D. C.

In this book the United States government has brought together some very interesting material regarding the construction and operation of the Panama Canal and the traffic passing through it. It contains chapters showing the distances saved in trade routes between important points by the canal route, how a vessel is handled through the canal, facilities for shipping, savings in cost of operation by use of the canal taken from specific instances, tolls, use of the canal by sailing ships, the effect of the canal on the navy, various features of construction, and traffic routes. The chapter on shipping facilities especially gives a large amount of official information which is valuable to shippers making use of the canal route.

Fuel Association Proceedings. Edited by C. G. Hall, secretary of the association. 398 pages, 6 in. by 9 in. Published by the association, C. G. Hall, McCormick building, Chicago, secretary. Price $1.00, bound in red morocco, and 50 cents, bound in paper.

This is the report of the seventh annual convention of the International Railway Fuel Association. This year the association considered the use of pulverized fuel on locomotives in a very comprehensive manner, and has, it is believed, the most complete information ever printed on this subject. The discussion contains many practical suggestions from the experiences of those who have used powdered fuel in stationary boiler service. A very complete report was made of the locomotive stoker situation. Other papers were presented on coal preparation, smoke prevention, fuel stations, fuel oil for locomotive use, storage of coal and the arrangement of front ends, ash pans, grates, etc.

Statistics of Railways of the United States 1904 *to* 1914. Bulletin No. 81, issued by the Bureau of Railway Economics, Washington, D. C.; 67 pages. 6 in. by 9 in. Bound in paper.

This is the third edition of the Bureau's annual series of compilations of statistics of the United States by ten-year periods. Bulletin No. 66, giving the statistics for the years 1900 to 1912, was issued last year and Bulletin No. 75, giving the figures for the years 1903 to 1913, was issued in March of this year. In publishing Bulletin No. 81, covering the figures for the period 1904 to 1914, the Bureau gives the most complete information yet available regarding railway results in the fiscal year 1914, compiled with the purpose of presenting in a form adapted for convenient reference the principal aspects of railway operation as shown by the official statistics.

The railway tabulations are based upon official data published by the Interstate Commerce Commission for each fiscal year, and tabulations concerning population and area are based upon the reports of the Census Bureau. The statistics are published in 76 tables, classified under the following heads: Population and Area; Railway Mileage; Capital Securities and Dividends; Revenues, Expenses and Taxes; Employees and Compensation; Equipment; Freight Traffic Statistics; Passenger Traffic Statistics and Accidents, the various tables under each head giving the principal details for each year. Where such division is suitable the figures are reduced to a mileage basis. The arrangement of the tabulations renders this bulletin of especial advantage from the standpoint of convenient reference because it brings together in comparable form the figures for 11 years, thus doing away with the necessity for consulting the different volumes of the Interstate Commerce Commission's statistics, and also because it includes the official figures for many of the most important details of the 1914 operations in advance of their publication by the Interstate Commerce Commission.

An especially convenient feature of the arrangement is the recasting of the figures for years prior to 1911, according to the three districts—eastern, western and Southern, which the commission has used since 1911, in place of the ten territorial groups used before that time. This makes it possible to obtain an accurate comparison of statistics for the various years without the necessity of combining the group figures.

Letters to the Editor

ELECTRIC LOCOMOTIVES ON THE BALTIMORE & OHIO

Washington, D. C.

To the Editor of the Railway Age Gazette:

In the paper entitled "Electric Motive Power in the Operation of Railroads" by E. H. McHenry, published in the *Railway Age Gazette,* October 1, page 602, there appears the statement that "the first commercially practical engines of this kind were operated by the Baltimore & Ohio through its Baltimore tunnel in 1905." This is evidently a misprint, as the first electric locomotives were put in operation by this road in its belt line tunnel under the city of Baltimore in 1895.

Hugh G. Boutell.

AN ANSWER TO "A CLERK'S PLEA"

Munhall, Pa.

To the Editor of the Railway Age Gazette:

The article, "A Clerk's Plea," by M. S., in your issue of September 10, is worthy of consideration by employee and employer alike—because both are vitally interested, or concerned—and his remarks apply to all clerical work, in large corporations as well as railroad offices.

Broadly and generally speaking, the vital principle involved (the lack of which is probably the cause of much of the incompetency of the men, as well as the ignorance of the employer as to their competency or incompetency) is co-operation. Co-operation, fully exemplified, will promote harmony, greater accuracy and efficiency, eliminate "dead timber" and suggest better wages. It is absolutely necessary among the men themselves, as it will suggest closer co-operation between them and their immediate superior; if there be a lack of this virtue between the superior and his men, it probably is because the superior, in his wisdom, foolishly lets the subordinate work out his own experience, instead of giving him the benefit of his own long experience, and thereby lightening his own burdens. The men must therefore take the initiative, and promotion by seniority will be suggested, as it will be difficult, under such circumstances, to pick out the best man. It will result in the survival of the fittest.

Wherever a man is found as being the first on the job, intelligent, interested, loyal and energetic in the pursuit of his duties, the last to leave his post, and then leaving only when all is done that can absolutely be done, that man, regardless of organizations, unions, or other affiliations, is bound to be finally recognized. Patience, however, is a virtue which not many of us possess, but which possessing pays well in the long run; also "The Lord helps them that help themselves" is a saying which, while much disparaged, contains a great truth. "A Clerk's Plea" exposes the individual, personal weaknesses of humanity generally, which each individual must overcome himself in order to succeed; no one is forced to learn; we are all free agents, having man's estate. If we do not exercise our given talents, we must accept the consequences.

The man who interests himself in his work and tries to learn more than he is paid to learn or do, soons commands attention from his superior, and it is so easy to do this, that the wonder is so few try to do it, if for nothing else than to be happy. The man who wants to learn and get along will always find a way to learn, and will be made to go along, because there are so few.

The world does not owe us a living, as so many think. We owe it to ourselves to work in the world, by the sweat of our brows, and the reward of our labors will be satisfaction, contentment, and joy in well doing. The great majority, however, do not sweat much. The hard-working, conscientious man, who has the interests of his company at heart, is, as M. S. says, scarce, and such a man, if not recognized, will soon seek new fields for his ability; no such man ever stays long in the company of "duffers"; and again the clerk, with heart and soul, who enters railroad service because of the recognition which this great industry offers, is bound to succeed, because such clerks are few.

In taking up railroad work to make it one's profession, one does not and cannot stick in an office. To succeed finally as a professional railroad man, one must get an insight into the practical workings of the various departments—braking, conducting, operating yards, despatching, surveying, engineering—or at least of some of them; there is no such "profession" as clerking, any more than there is as "grocerying." There are clerks and clerks. Anyone who can wield a pencil or pen must, of necessity, call himself a "clerk" if he be so employed; one great trouble with clerks is that there are so many of them, and being also a field in which women enter more readily than any other "man field," wages are probably lower, except in executive positions. Then again, to crowd this field still more, the average young fellow, when he leaves school, wants to get into an office, because he can be dressed up. He does not like to come or go from home in overalls, or a working shirt, while learning a trade which would in all probability carry him around the world without a dollar in his pocket. He prefers to accept the office job, and only realizes when it is too late that he has idled his time away, reading the "sporting edition," playing billiards, and loafing around street corners, instead of cultivating some useful study, which could affect or have some relation to his daily work.

Mr. Basford in his article in the issue of July 23 said: "Many of the best high officials have been clerks; they did not rise because they were clerks, but in spite of that fact." That is the keynote to every condition in life; to succeed in spite of circumstances. If a man be a clerk he can make himself a very excellent clerk, if he so wills, but the great majority do not so will, and waken up too late to the fact that opportunity has knocked and passed on.

A man in any line may be a steady, plodding kind of a fellow, following the beaten track, with no initiative at all, satisfied with his bread and butter, and contented with this condition; but this man is bound to be passed by the man with red blood in his veins, ambitious, who exercises his brain and promotes energy all round by his activity, mentally and physically, in the office, field, or factory, and who knows all the time that he will succeed.

"A Clerk's Plea," after reading it carefully, seems to me to be a misnomer; it should have been termed "A Clerk's Whine."

M. S. says: "We may be honest and earnest in our efforts, but the lack of specific knowledge, etc., etc.," and then he asks, "Is it our fault? If it is, our failure to do the right thing has not been pointed out to us"; why are there no schools for us, and why don't competent men write books for us, and why this and why that? Is it our fault? Of course, it is your fault; you can take or lead a horse to the well, but you cannot make him drink; where there's a will there's a way; and if you don't at first succeed, try, try again.

Experience is, probably, after all, the best teacher for the everyday affairs of life, and if those of us who have learned our lesson in the school of experience would have a little patience and co-operate with the younger and ignorant element (who must display their ignorance, in order to profit from the experience of their elders, and that, too, in a much shorter time), it will do much to eliminate such complaints as those advanced by M. S.

I sympathize with all that M. S. says, but a "man's a man for a' that," must be proved by the man.

K. Lean.

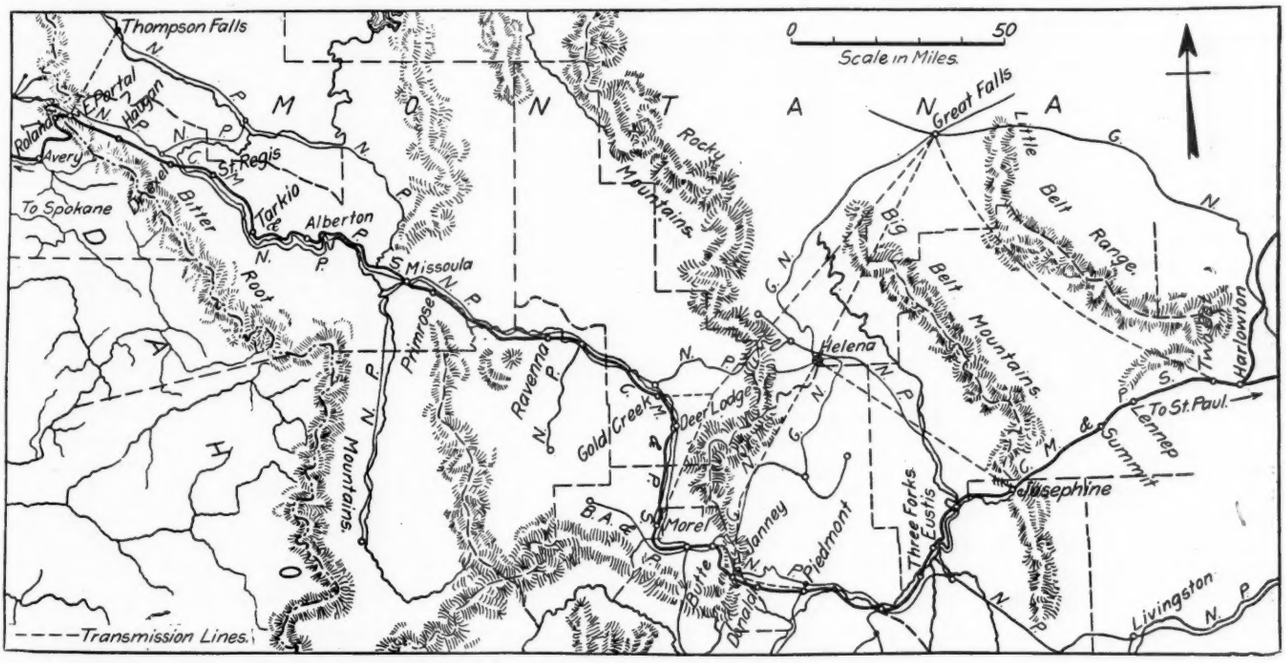
English Railway Stations Closed.—The North-Eastern Railway recently decided that, owing to the enlistment of railwaymen and the consequent shortage of staff, a number of its stations would be temporarily closed, effective Monday, September 20.

Electrification of 440.5 Miles of the St. Paul

A Description of the New Construction Work on Four Entire Engine Districts with Heavy Mountain Grade

The Chicago, Milwaukee & St. Paul is now actively engaged in the electrification of 440.5 miles of main line and 141 miles of side and yard tracks on its Puget Sound extension between Harlowton, Mont., and Avery, Idaho. This includes the Rocky Mountain and Missoula divisions with four engine districts and intermediate terminals at Three Forks, Deer Lodge and Alberton, Mont. Work on the district between Three Forks and Deer Lodge, including 113 miles of line and 168 miles of all tracks, is now practically completed and it is expected that this section will be ready for electric operation shortly after November 1. The electrification of the eastern district between Three Forks and Harlowton is also nearing completion and it will be placed in service soon after January 1, 1916. Work is also under way on the two western districts comprising the Missoula division and it is expected that this division will be operated electrically by January 1, 1917. This entire project involves an expenditure estimated at $15,000,000.

This project is of special interest to railway men for a number of reasons. With only one or two exceptions, all previous electrification installations have been made to relieve local smoke conditions in cities or tunnels or to reduce congestion at certain specific points, and not primarily to effect economies of operation. This project of the St. Paul is being developed to reduce the cost of operation, the smoke problem being negligible, and there being no traffic congestion as this line is single track with only a moderate traffic. Also, while other installations have been of limited mileage and have only served to create constructive mileage for train crews in most cases, this supersedes steam operation on four entire engine districts, affording opportunity for the full development of economies in yard as well as line operation, and for the working out of methods for electrical operation on a much larger scale than heretofore possible.



Map of the Electrified Line and Sources of Power Supply

PHYSICAL AND TRAFFIC CONDITIONS

Between Harlowton and Avery this line crosses the Belt, Rocky and Bitter Root mountains. The Belt mountains are crossed at Summit, 45 miles west of Harlowton, at an elevation of 5,795 ft., with a one per cent grade 14 miles long on the east slope and a one per cent grade 44 miles long on the west slope. The length of this latter grade presents one of the most serious problems encountered in this installation. The Rocky Mountains are crossed at Donald, 124 miles west of Summit and 18 miles east of Butte, at an elevation of 6,350 ft. The eastern slope includes 20.8 miles of two per cent grade and the western slope 10 miles of 1.66 per cent grade. The third district between Deer Lodge and Alberton descends continuously westward on a maximum grade of 0.4 per cent. The crossing of the Bitter Root mountains is made at Roland, Idaho, at an elevation of 4,200 ft. The summit is reached by 12 miles of 1.7 per cent grade on the east slope and 24 miles of 1.7 per cent grade on the west side. Over 6,250 ft. of rise and fall is overcome between Harlowton and Avery.

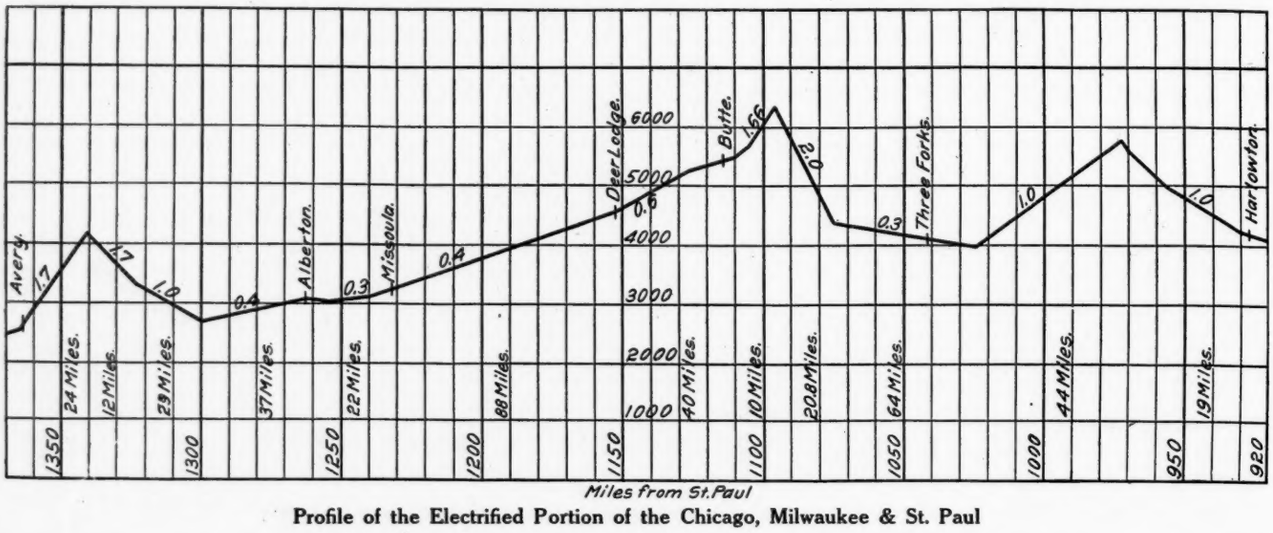
As would be expected in such mountainous country, the curvature is heavy, the maximum degree of curve being 10 deg. There are 36 tunnels between Harlowton and Avery, 16 of which are on the western slope of the Bitter Root mountains. The longest is the St. Paul Pass tunnel at the summit of the Bitter Root mountains, 8,751 ft. in length.

The traffic consists of two heavy transcontinental passenger trains with a third local passenger train between Harlowton and Butte, and an average of four tonnage freight trains each way daily, with a local freight every second day. The freight traffic amounts to about 15,000 gross tonnage daily. Under ordinary conditions the prevailing tonnage is eastbound and consists largely of grain, lumber and other dead freight. Normally one-time freight is able to handle all eastbound expedite business. Westbound, nearly all the traffic consists of merchandise and other time freight.

The local traffic originating within the limits of the electrified zone is relatively small, Butte and Missoula being the only cities of any importance. While the St. Paul brings considerable freight into Butte, it is the latest road into the city and reaches many industries only through connecting lines.

At the present time a 2,000-ton train is hauled up one per cent grade with one Mallet road engine. Helpers are added on the heavier grades, 7 engines being held in this service on the Rocky Mountain division, as compared with an average of 23 road engines.

Only three short branches connect with the main line between Harlowton and Avery and these will not be electrified at present. A considerable amount of business originates along the Great Falls line, which connects with the main line at Harlowton, but practically all this goes east. Almost all the traffic handled therefore, comes from points west of Avery. This traffic is growing regularly and the electrical equipment now being installed is capable of handling a tonnage train in each direction every two hours, or nearly double the present business.



Profile of the Electrified Portion of the Chicago, Milwaukee & St. Paul

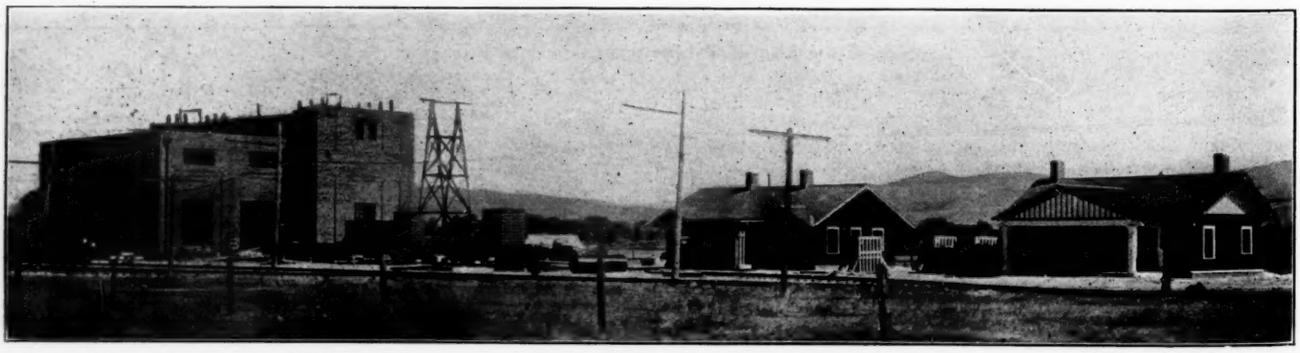
SPECIAL CONSIDERATIONS

One of the considerations leading to the decision to electrify this portion of the St. Paul was the favorable results secured from the electrification of the Butte, Anaconda & Pacific, which parallels the St. Paul west from Butte for a short distance. As described by J. B. Cox in the *Railway Age Gazette* of December 25, 1914, the first year's electric operation of this line showed an increase of 33 per cent in the average train load and a saving in operating expenses equal to 20 per cent return on the investment.

Such savings are brought about in large measure by the high cost of coal and the cheapness of electric power. The St. Paul secures the coal used in this district from company mines located on its line at Roundup, Mont., 70 miles east of Harlowton, giving an average haul over this zone of 300 miles. This coal costs an average of $2.75 per ton at the point of use. It also provides about 1,000 tons of westbound traffic daily, although this is not as serious as might be supposed, as it is in the direction of light tonnage. Power is secured by contract with the Montana Power Company at the unusually low price of 0.536 cents per kw. hour, based on a 60 per cent load factor.

Important operating economies are expected from this development, but because of the numerous new problems to be solved, many of the proposed methods of operation are only tentative and subject to wide variations as they are put in practice. One of the important innovations which will be introduced is that of running freight and passenger engines over two districts, changing crews at the intermediate terminals. While trains will be inspected at Three Forks and Alberton and bad-order cars set out, the delays at these points will be small compared with present methods of operation, while it will be necessary to maintain only a few men at these points. At Harlowton, Deer Lodge and Avery, the engines will be inspected, but they will be sent through the shop only after they have made about 2,000 miles.

Another feature of special interest is the regenerative system of operation of the electric locomotives by which the surplus energy not required to hold the trains on the descending grades will be returned to the line for further use. By this means not only will there be added safety on the heavy grades, as the regular air brake equipment will be held in reserve for emergency use, but the excessive wear on wheels and brake shoes will be eliminated. Of secondary importance is the returning of the surplus power to the line, affording a material saving in power consumption, the arrangement with the power company providing that the railroad is given credit for all energy returned. While the amount of power so returned can only be estimated within wide limits and will depend on the distribution of trains and other conditions, it has been estimated that 15 per cent to 18 per cent should be recovered in this way. The speeds of trains descending grades will not be fixed arbitrarily, but



The Piedmont Substation and Bungalows

will instead be left in the control of the engineer within broad limits.

Another original and interesting feature is the power limiting and indicating system which is being installed, by which the speeds of trains and the amount of power consumed will be fixed by the load despatcher. In this way, to avoid excessive peak loads, the despatcher can limit the amount of power taken by any train, assisting passenger and other preferred trains and holding back secondary trains. As far as practicable trains will also be so spaced that a descending train will be returning power to the line when others are ascending.

THE POWER SUPPLY

Power is secured from the Montana Power Company and is delivered by this company at the right of way at substations located at Two Dot, Josephine, Piedmont, Janney, Morel, Gold Creek and East Portal. With the exception of that delivered at East Portal, all power comes from the hydro-electric developments at Great Falls, the road lying roughly in the arc of a circle of a radius of about 100 miles, with Great Falls as the center. The power delivered at East Portal is generated at Thompson Falls, a relatively recent development. The power plants developed and proposed by this company have a total capacity of 244,000 hp., while large storage reservoirs are in service, insuring an ample continuous supply of power. By this arrangement, the railroad secures power without the necessity of making the large initial investment which would otherwise be required, while, by combining this with its large commercial load, the power company is able to sell the power cheaper than if it all went to the railroad.

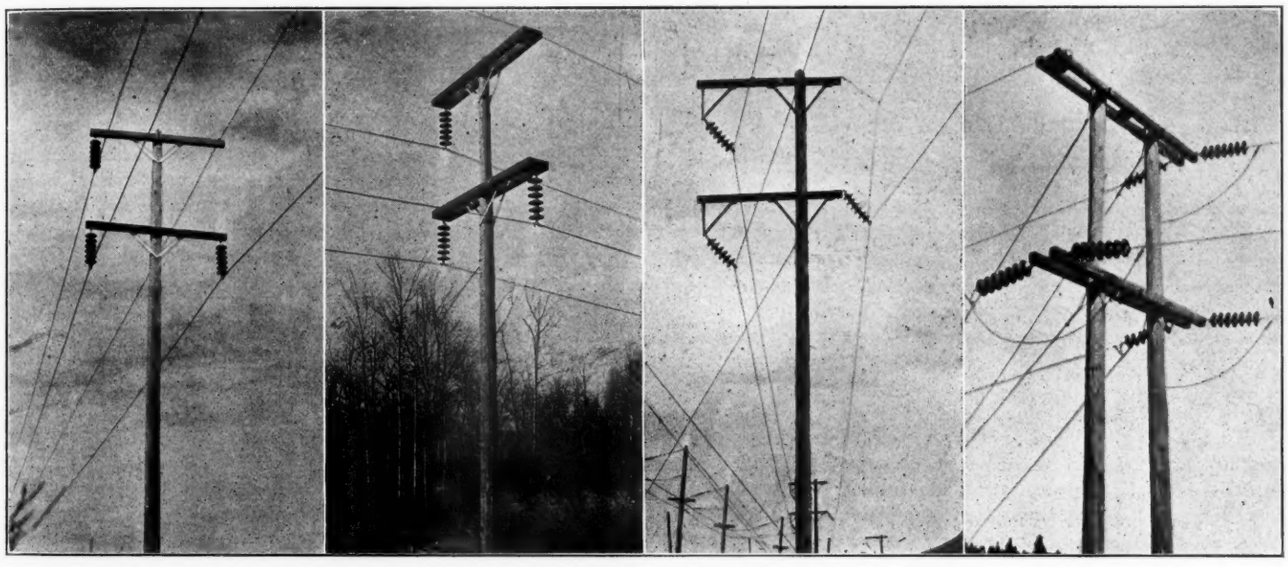
This power is brought to the right of way as 100,000-volt, 3-phase, 60-cycle alternating current. To deliver it at the required places it was necessary to construct 100 miles of transmission line to reach Two Dot, 54 miles to reach Josephine, and 135 miles to reach Morel. In the vicinity of Butte, power was secured by tapping existing lines. These new lines consist of two 45-ft. wooden poles spaced 10 ft. 6 in. apart, and supporting a wooden cross arm 22 ft. long. Three transmission wires are supported from this cross arm by suspension insulators, one between the two poles and one near each end. Twelve of these supports were built per mile.

THE SUBSTATIONS

Fourteen substations are being built between Harlowton and Avery. They are spaced an average distance of 33 miles apart, the exact locations depending on the grades and the power consumption. They are located at Two Dot, Summit, Josephine, Eustis, Piedmont, Janney, Morel, Gold Creek, Ravenna, Primrose, Tarkio, Drexel, East Portal and Avery. In all cases the points of delivery of energy by the power company are at substations to permit one attendant to operate the switches on both lines.

The substation buildings are of permanent construction throughout, with concrete foundations, brick walls and concrete roofs carried on steel purlins and roof trusses. To provide proper ventilation for the motor generator sets, the foundations for this equipment are arched with a basement underneath and openings in the exterior walls for air inlets. The supply of air is controlled by steel sash operated as butterfly valves. All sash in the main buildings are also of steel and are controlled by chains or rods.

The floors are of concrete and contain conduits carrying power transmission lines to the various equipment units. The only conduits exposed to view are those for building lighting and those leading to the outside feeder system. A standard gage track is built in the floor on which will be operated a steel car or truck to transfer heavy equipment from one part of the building to another. A steel turntable is also being installed.



Standard Transmission Line Construction (1) on Tangent with 300-ft. Spans. (2) On Tangent with Spans of 450 Feet. (3) On Curves up to 10 Degrees. (4) On Curves Between 10 Degrees and 30 Degrees

The roof consists of reinforced concrete slabs 3 in. thick supported on steel trusses and covered with a five-ply tar and gravel roof. All substations are built with flat roofs except those at Drexel, East Portal and Avery, which are provided with pitched roofs because of the very heavy snowfall in the Bitter Root mountains. Otherwise they are of the same construction as the other stations except that the horn gaps for the lightning arresters are placed indoors, increasing the size of the buildings somewhat.

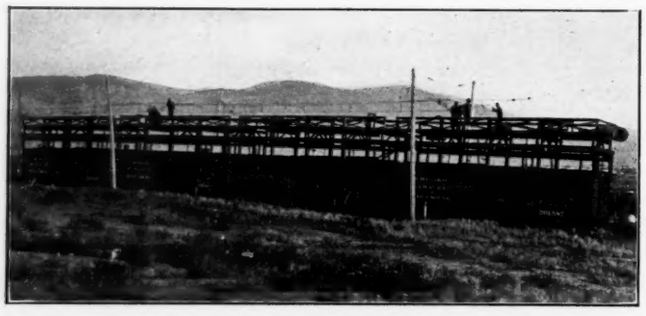
The substations are divided into two rooms, the motor generator or low tension room, and the transformer or high tension room. The partition is of brick, with two tin-clad doors for protection. One corner of the motor generator room is partitioned off and, with a bay built onto the building, forms the office. The interior walls are painted white above a green wainscot five feet high. All doors, sash and other exposed steel, conduits and substation equipment are painted black.

At the substations the 100,000-volt, 60-cycle, 3-phase alternating current is converted to 3,000-volt direct current. On delivery at the substations this 100,000-volt current passes through oil switches to the high tension bus, from which it is conducted through further oil switches to the transformers, emerging at 2,300 volts a.c. The current is then led through suitable

switches to the motor generator sets, leaving at 3,000 volts d.c., and passing through control switches on the switchboard to the feeder system at this potential.

The transformers are rated 1,900 and 2,500 k.v.a. and are provided with four 2½ per cent voltage taps and 50 per cent motor starting taps.

In the standard station the motor generator sets comprise a 60-cycle synchronous motor, driving two 1,500-volt d.c. generators connected permanently in series for 3,000 volts. The fields of both the synchronous motors and the direct current generators are separately excited by small generators direct-connected to each end of the motor generator shaft. The direct current



Erecting the Overhead Work

generators are compound wound and will maintain constant potential up to 150 per cent overload with a capacity for momentary overloads up to three times their normal rating. To insure good commutation on these overloads, the generators are equipped with commutation poles and compensating pole face windings. The synchronous motors will also be used as synchronous condensers and it is expected that the transmission line voltage can be regulated in this way so as to eliminate any effect of the fluctuating load.

The transformers weigh 28 tons and the motor generator sets 66 tons. They are assembled in units of a maximum weight of 10 tons each to permit handling readily. A hand-operated traveling crane in the motor generator room and a triple chain block hoist in the transformer room, each with a capacity of 10 tons, are installed to handle the equipment.

The substation at East Portal has a transformer room 30 ft. by 170 ft. and a motor generator room 40 ft. by 77 ft., with the ridge of roof 55 ft. above the ground. The two-unit substations have transformer rooms 30 ft. by 87 ft., and motor generator rooms 40 ft. by 60 ft., while the three-unit substations have transformer rooms 30 ft. by 101 ft., and motor generator rooms 40 ft. by 77 ft. The height of roof of the flat top buildings is about 45 ft.

The source of water supply at the substations varies with the local conditions and includes deep wells, springs and streams. To insure adequate pressure, underground steel pneumatic tanks are installed, with electrically-driven pumps equipped with auxiliary air pumps. These pumps are automatic, starting and stopping at given pressures.

Special attention has been given to the provision of attractive bungalows and surroundings at the more or less isolated locations of the substations to make the living conditions of the operators as good as possible. To this end one four-room and one five-room bungalow of attractive design have been built at each substation as homes for the operators. These buildings are equipped with electric lights and running water. Each station layout is designed and painted differently to give it individuality.

THE TRANSMISSION LINE

The power distribution system includes the transmission line, the positive or outgoing feeder system, the overhead contact system and the negative or return system. A 100,000-volt transmission line, entirely independent of the power company's line, extends from Two Dot to Morel and from Gold Creek to Avery. In general, this line is located on the right of way, although it leaves it at numerous places where distance can be saved, and it passes over the summits of all tunnels. Disconnecting switches are placed in the line on each side of each substation, permitting power to be taken from either direction and providing relief from break-ins or trouble on any individual section of the line.

The construction of a 100,000-volt line along a right of way on which there are telegraph and telephone lines involves special problems in itself, the telephone being used for despatching purposes and the telegraph for commercial business. To reduce the interference as much as possible, the transmission line is

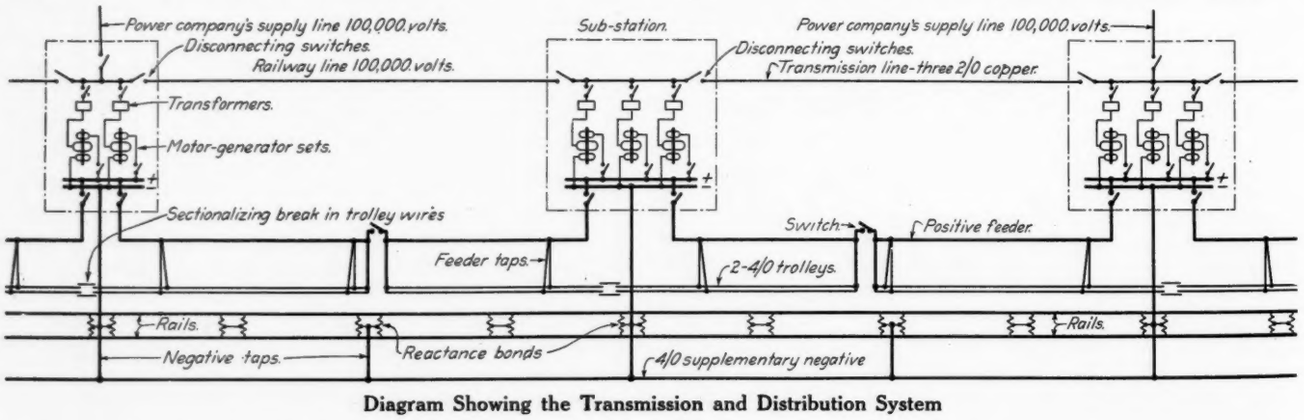


Diagram Showing the Transmission and Distribution System

Because of the difference in power demands, the generating equipment varies somewhat. At Piedmont and Janney three 1,500 kw. motor generator sets have been installed, while at all other stations between Harlowton and Deer Lodge two 2,000 kw. motor generator sets are being installed. At East Portal, near the western end, the largest substation will be built, containing three 2,000 kw. motor generator sets. This station will also receive two taps from the power company's transmission line, while provision will be made for a future second transmission line belonging to the railway company westward as a precautionary measure, because of the heavy snowfall in this vicinity.

located on the side of the track opposite the other lines and near the right of way fence. At points where the telegraph lines formerly crossed over the track, they are placed underground to prevent physical contact with the transmission line under any conditions. Where the transmission line crosses the telegraph line, it is strengthened to give it a greater factor of safety.

The transmission line is built with Idaho cedar poles 45 ft. and 50 ft. long, with a minimum diameter at the top of 8 in. The cross-arms are of Washington fir and are 4¾ in. by 5¾ in. in cross section. For tangent work braces of ¼ in. by 2 in. galvanized steel are added. Three conductor wires are carried, each

consisting of six strands of copper with a hemp core. The copper is 0.15 in. in diameter and the completed conductor 0.45 in. The hemp core is saturated with a preservative compound, making it impervious to moisture, and is used to increase the size of the conductor. The standard distance between poles on tangents on level ground is 300 ft. Where the length of the individual wires supported by a pole is 450 ft. and over, double cross-arms are used as shown in one of the photographs. In marshy ground or where the poles are exposed to side wash, they are guyed and banked with rock.

For curve and angle work where the angle does not exceed 10 deg., the cross-arms are offset to provide the desired clearance between the wire and the pole and they are more heavily braced. For angles between 10 deg. and 30 deg. a two-pole structure heavily guyed and fitted with double arms and insulators is used, supporting the transmission wires at the level of the cross-arms.

The standard suspension insulator with six discs is employed, this type requiring 340,000 volts to arc over it when dry and 250,000 volts when wet. At anchorage and heavy strain points an insulator with seven additional discs is used for further protection.

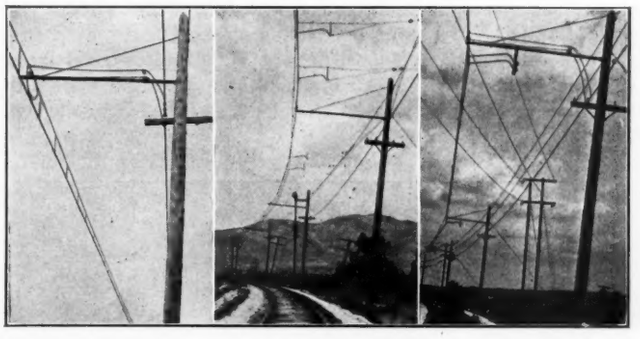
In addition to the one conductor wire the upper cross-arm carries an uninsulated ground wire of ⅜-in. Siemens Martin steel strand, grounded at every pole with a wire of the same size. This is provided as additional protection from lightning, both for the line insulators and the substation equipment.

THE FEEDER AND TROLLEY CONSTRUCTION

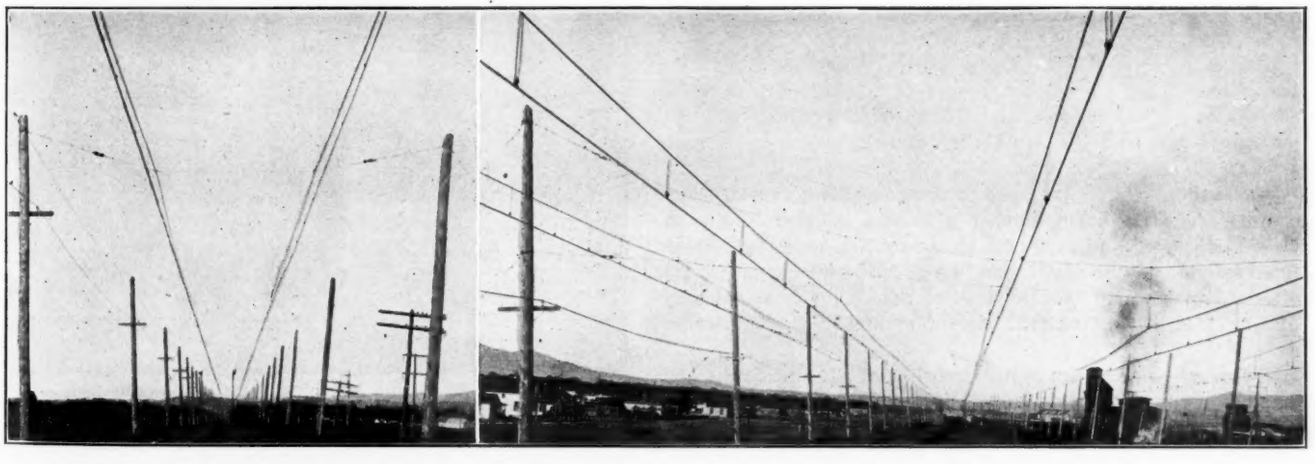
The outgoing feeder system consists of one or two lines of standard bare copper cable of either 13/16 in. or 1 in. diameter. For the greater part of the distance a single line of the smaller cable is used, but on the heavier grades two feeders are required. The feeder is connected with the trolley wire at intervals of 1,000 ft. by bare 9/16 in. copper strand cable, as shown in one of the photographs.

Disconnecting switches are inserted in the feeder line on each side of each substation. Sectionalizing switches are also installed beyond the outlying switches at each yard and passing track, and at each end of all long tunnels, enabling any section of the line to be cut out at the time of a derailment, or for any other reason, without disturbing operation beyond the adjacent stations. Likewise, in case of an accident damaging both the track and trolley line, any section of the line can be "killed" and repair work conducted simultaneous with that on the track. These sectionalizing switches are mounted high on the trolley pole, removing all "live" parts from the operator, while the operating handle is placed about five feet above the ground and is locked with a switchlock, making it accessible to any properly authorized employee. Shortly before a district is placed in operation complete instructions will be issued to all employees concerned, instructing them regarding the purpose and manner of using these switches.

The feeder system is carried on the common pole line with the trolley system. The poles are of Idaho cedar 40 ft. long and 8 in. minimum diameter at the top. They are spaced 150 ft. apart on tangents, the spacing decreasing in multiples of 15 ft. on curves to a minimum of 90 ft. They are set on an outward batter of ½ in. to 1 ft. on tangents and slightly more on curves. Special forms of pole construction were adopted on the numerous bridges on this line as shown in the accompanying photographs. On through girder structures, the poles rest on two angles placed back to back outside the girder. The base is held in place by a U-bolt passing around it and bolted to a short angle which is in turn riveted to the other angles. Another U-bolt near the top of the girder holds the pole in position. On deck girders the poles are supported by brackets framed of angle irons with U-bolt connections at the top and bottom. On pile trestles two 3-in. by 12-in. timbers are bolted to the two piles at one side of a bent, projecting beyond the bent and supported at the outer end by knee braces. The pole rests on this and is held in place by a second set of 3-in. by 12-in. timbers projecting beyond the pile cap and bolted through the pole.



Standard Trolley Construction—Trolley Construction on Tangents with Feeder Tap (left); "Pull Overs" on a Heavy Curve (center); Steady Braces and Feed Tap on Light Curve (right)



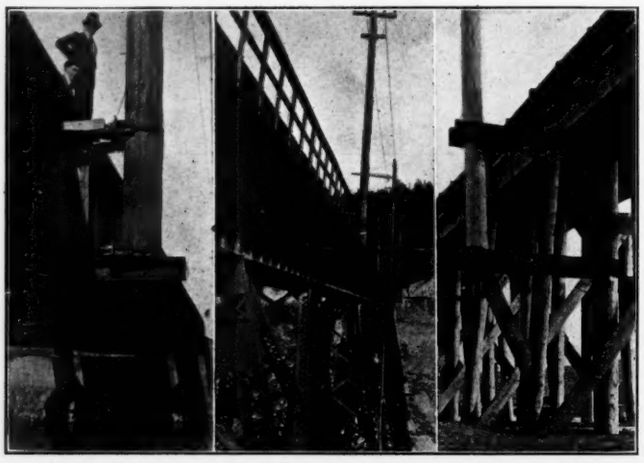
Overhead Construction for Two Tracks (left); Overhead Construction in Three Forks Yard (right)

A cross-arm of Washington fir 3¾ in. by 4¾ in. in cross section carries the feeder wires. The messenger and trolley wires are supported by a bracket arm consisting of a 2½-in. by 2½-in. by 5/16-in. tee iron with a ⅝-in. truss rod extending from a connection near the outer end to the top of the pole.

The overhead contact system consists of the messenger and trolley wires, both of which are anchored at intervals of a

mile. The messenger wire is a seven-strand galvanized steel cable ½ in. in diameter, supported directly from the bracket arms. The trolley system is unusual in that two 4/0 copper contact wires are provided, both of which are supported at intervals of 15 ft. from the messenger wire by hangers, spaced 7½ ft. apart and supporting the two trolley wires alternately at an elevation of 24 ft. 2 in. above the top of rail. This form of construction with two wires, one of which is always flexible, permits the collection of heavy current with the current collector without sparking or excessive heating under the two extremes of heavy current consumption and high speed. Only one trolley wire is provided for yard and side tracks.

On curves up to six degrees and on curve easements steady braces are placed on each bracket arm to pull the trolley wires over, as shown in one of the photographs. On curves sharper than this a "backbone" consisting of a galvanized steel strand extends from pole to pole with "pull-offs" connecting with the messenger and trolley wires. The number of "pull-offs" depends on the degree of curve.



Special Construction on Through Girder Bridges (left); Steel Viaducts (center); Pile Trestles (right)

A special form of construction is provided in tunnels. Two suspension insulators attached to the roof of the tunnel 28 in. apart support a 3-in. 4-lb. inverted channel which carries the messenger wire and the two feeder wires spaced 6 in. at each side.

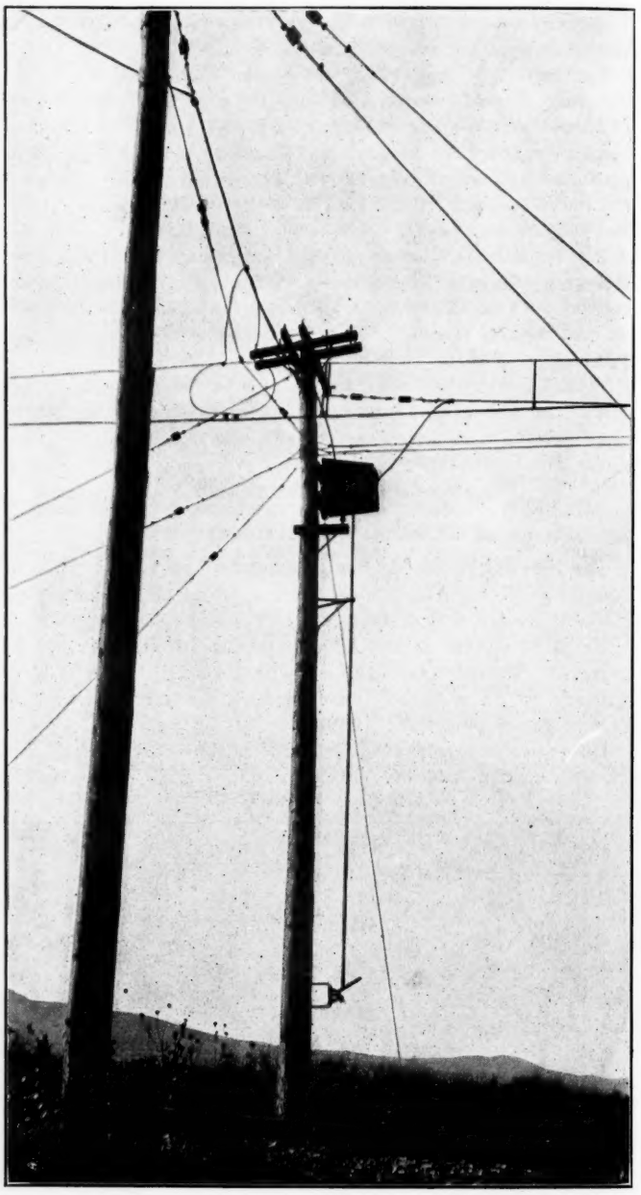
Where there is more than one track two-pole span construction is used. The maximum number of tracks spanned is nine in Deer Lodge yard. In yards the cross catenary span supports an intermediate or "steady" span which in turn supports the messenger wire. It is not designed to relieve the cross catenary of any load but is adopted simply to steady the messenger wire.

The negative or return system consists of the track rails and an auxiliary ground wire. The track rails are bonded with ⅝-in. copper bonds placed either under or outside the angle bars, depending on the type of joint in use. The return ground wire consists of a ½-in. copper cable carried on the top of the trolley poles without insulators. It is connected to the rails at every second signal station. In addition to providing protection for trackmen, this ground wire, located above the trolley, feeder and signal wires, affords effective protection from lightning for all these circuits and eliminates the necessity for lightning arresters for the first two. At tunnels the ground wire is hung from the side wall about six feet above the track.

THE LOCOMOTIVES

At the present time 43 locomotives have been ordered, the first of which are now being delivered. These locomotives are the first to be built for so high a potential as 3,000 volts d. c. The passenger and freight locomotives are similar in all respects except that the former have a gear ratio permitting the hauling of a trailing load of 800 tons at 60 miles per hour. The passenger locomotives are also provided with oil-fired steam-heating outfits for the heating of the trains. The interchangeability of parts for these freight and passenger locomotives will be of material assistance in the maintenance of this equipment.

The cab consists of two sections each approximately 52 ft.



A Sectionalizing Switch Beyond the End of a Passing Track

long. The outer end of each section contains a compartment for the engineer and helper and the remainder is occupied by the equipment. The engineer's compartment is double lined, with hair felt insulation, while a 3,000-volt heater driven by a small motor removes the cold air from the floor. Each locomotive carries eight motors, each with a normal one-hour rating of 430 hp. and a continuous rating of 375 hp. or a total continuous rating of 3,000 hp. With a 30-per cent co-efficient of friction the tractive effort available for starting trains is approximately 135,600 lb. Each motor is twin-geared to its driving axle, a pinion being mounted on each end of the armature shaft. The rim of the gear is mounted in such a way that its relation with the spider is fixed by springs, allowing flexibility between the two. The motor is of the commutating pole type with openings for forced ventilation provided by a motor-driven

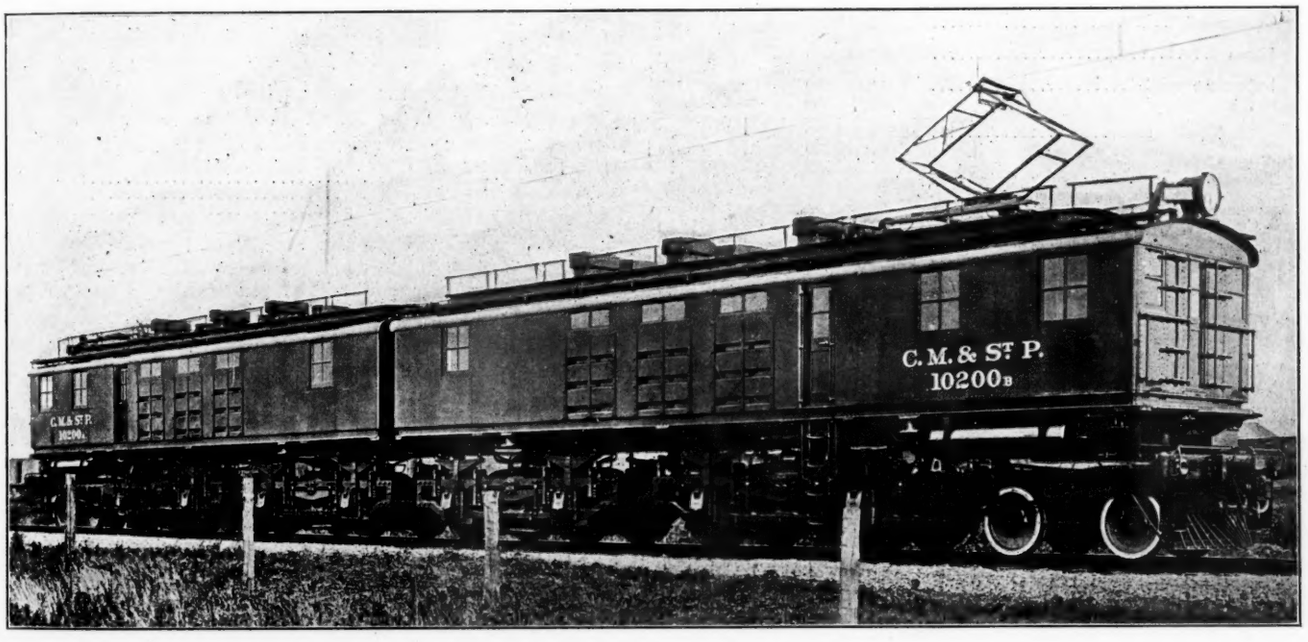
blower in the cab. Each locomotive is equipped with a speed recorder and with flange oilers provided with an electric heater. The headlight is of the incandscent type with a 30-volt, 150-watt lamp. Each locomotive is also provided with a watt-hour meter showing the amount of power consumed at any time, which will be of value in figuring the cost of moving any particular train or class of traffic. Each half of the locomotive is equipped with an air compressor working against a pressure of 135 lb. in the main reservoir. Each compressor has a capacity sufficient to hold an ordinary train on these grades.

The passenger locomotives are designed to haul 800 tons on all grades up to two per cent and will maintain the present schedule with 650 tons. With trains heavier than this or on grades of two per cent, a second locomotive will be added. They are expected to handle such trains at a minimum speed of 30 miles an hour, while the maximum allowable speed is 60 miles per hour. The speed down the heavy grades is limited to 25 miles an hour by the operating rules of the road. Short local passenger trains will be operated by single units or half locomotives. In descending grades, the passenger locomotives are so arranged that one-half may be returning power to the line while the second unit will provide lights for the train or charge

Total length of locomotive	112 ft.
Rigid wheel base	10 ft. 6 in.
Voltage	3,000 d.c.
Voltage per motor	1,500 d.c.
Horsepower rating, one hour, each motor	430
Horsepower rating, continuous, each motor	375
Horsepower rating, one hour, complete locomotive	3,440
Horsepower rating, continuous, complete locomotive	3,000
Trailing load capacity, 2 per cent grade	1,250 tons
Trailing load capacity, 1 per cent grade	2,500 tons
Approximate speed at these loads and grades	16 m.p.h.

This electrification has necessitated the changing over of the present automatic signals to alternating current. These signals now extend from Three Forks to Lennep, 78 miles, from Piedmont to Butte, 37 miles, and from St. Regis to Haugan, 19 miles. Additional signals are now authorized between Butte and Finlen, 13 miles. These are being built not alone to eliminate electrical interference, but also to improve the view of the signals by placing them lower and in new locations.

This installation is being made under the direction of C. A. Goodnow, assistant to the president, and R. Beeuwkes, electrical engineer of the St. Paul. The General Electric Co., Schenectady, N. Y., is building all equipment. The Montana Power Company is the contractor for the construction of the transmission and trolley lines and for the installation of the substation equip-



One of the Electric Locomotives

the storage batteries. These functions are interchangeable and under the control of the engineer.

The freight locomotives are designed to haul 2,500 tons trailing on one per cent grades at a speed of 16.8 miles per hour. On all other grades in this line a second locomotive will enable trains of the same weight to be handled. The maximum speed of the freight locomotives is 30 miles per hour, while freight trains are limited to 15 miles per hour descending the heavy grades.

Six electric locomotives will be assigned to helper service on the Rocky Mountain division. With the original installation on this division, switching service will demand one electric locomotive each at Three Forks, Butte and Deer Lodge. With the completion of the work to Avery an additional switching locomotive will be required at Alberton. Special facilities will be provided at Deer Lodge for the maintenance of the electrical equipment.

The general characteristics of the locomotives are given below:

Total weight	284 tons
Weight on drivers	226 tons
Weight on each guiding truck	58 tons
Number of driving axles	8
Number of motors	8

ment. All building work is being done by company forces. The work on the first district was started in June, 1914, but was suspended nearly all summer by labor disturbances, so that it really began about a year ago.

THE ENGLISH RAILWAYMEN'S WAGES QUESTION.—The question of a proposed increase of wages in substitution for the war bonus granted to railwaymen in February last has been under discussion by the executive committee of the National Union of Railwaymen, which has forwarded a request to the railway companies to receive a deputation on the matter. The railway companies have now before them the men's request for an advance of wages and also for a joint conference on the question, but no definite arrangements in either respect have yet been concluded. Meanwhile, the executive committee of the National Union of Railwaymen have strongly deprecated any precipitate ill-advised or sectional strike in this hour of national crisis. A railway conciliation board meeting at Cardiff has satisfactorily settled the dispute of the Taff Vale engine drivers and firemen over reductions in grade and pay, which at one time threatened to give rise to considerable trouble.—*Railway Gazette, London.*

ANNUAL REPORT OF THE RAILWAYS OF THE UNITED KINGDOM

The commercial department of the British Board of Trade has given out the following report of the railways of the United Kingdom, for the calendar year 1914, with comparative figures for the previous year. It is stated that on account of the war, no further statistics for the year will be published:

Summary for the Year 1914, with Comparative Figures for 1913.

Mileage of Lines open for Traffic.	1914. Miles.	1913. Miles.
Running lines:		
First track	23,701	23,691
Second track	13,403	13,392
Third track	1,648	1,619
Fourth track	1,277	1,254
Over four tracks reduced to single track	706	700
Sidings reduced to single track	14,928	14,749
Total of single track, including sidings	55,663	55,405
Authorized Capital.		
Shares and stock	$5,046,016,500†	$4,885,481,250
Loans and debenture stocks	1,989,110,520	1,979,521,740
Total	$7,035,127,020†	$6,865,002,720
Paid-Up Capital. (The figures preceded by (*) show the nominal additions to capital included in the figures above.)		
Ordinary	$2,399,824,260	$2,396,291,040
	*453,520,620	*451,134,360
Preferential	173,990,430	1,724,308,560
	*213,703,920	*213,752,520
Guaranteed	604,263,240	604,268,100
	*84,384,180	*84,384,180
Loans	62,810,640	58,820,580
	—	—
Debenture stock	1,711,536,480	1,699,605,180
	*216,517,860	*216,513,000
Total	$6,518,338,920	$6,483,293,460
	*968,026,580	*965,784,060
Engine Mileage.		
Train-miles, including empty trains run for traffic purposes on either the forward or the return journey:	Miles.	Miles.
Coaching (passenger)	273,659,000	273,495,000
Goods	156,007,000	161,684,000
Mixed	666,000	672,000
Total	430,332,000	435,851,000
Shunting miles:		
Coaching (passenger)	18,910,000	18,665,000
Goods	116,110,000	119,142,000
Mixed	59,000	58,000
Total	135,079,000	137,865,000
Other miles (assisting, light, &c.)	55,828,000	54,608,000
Total engine miles	621,239,000	628,324,000
Revenue Receipts and Expenditure.		
Total receipts (including miscellaneous net receipts)	$676,016,280††	$677,731,860
Expenditure	428,520,780	424,375,200
Net Income	$247,495,500	$253,356,660

†Including nominal additions to the amount of $142,470,900 which were excluded from the total for 1913.

††Including the estimated amount receivable by the Companies, under agreement with the Government, in respect of the control of British railways during the period from August 5 to December 31.

Railway Construction in British South Africa.—The fact that a passenger may now enter a compartment at Johannesburg Station and alight at Walvis Bay without change is indicative of the transportation enterprise and expedition which have been taking place in the last few months on the southwest border of the Cape and in the territory lately held by the Germans. In the course of one of the numerous speeches which General Botha has been making recently, he stated that the total number of miles of railway construction since Union until the end of July, 1915, was 1,449, while another 950 miles would be ready at the end of this year.

Electrification in Sicily.—A Milan syndicate has submitted to the Italian Government a scheme for the electrification of the light railways on the Island of Sicily, the total length of which is about 625 miles. According to the project, the necessary current would be taken from the generating station of the Societa Eletrica della Sicillie Orientale, and converted from three-phase to single-phase current at 50,000 volts at a large converting station to be established at Nicosia. Fourteen transformer and distributing stations would also be established along the railways, where the voltage would be transformed to a working pressure of 11,000 volts.

CHILLED IRON WHEELS

The Association of Manufacturers of Chilled Iron Wheels met in New York on October 12. In addressing the meeting George W. Lyndon said in part:

It is gratifying to know that the chilled iron wheel has not only been able to maintain itself as the wheel standard of the United States and Canada, but it is beginning to supplant the European standards, as evidenced by the fact that several manufacturers of this association are supplying chilled iron wheels in large quantities to the French and Russian governments.

That our flange recommendations are in the line of improvement is fully demonstrated by the fact that we have at the present time over one-half million wheels running that are finding their way through the present track construction without any complaints. The flange used on special wheels is 3/32 in. thicker than the M. C. B. flange and the flange as shown in our final argument is 3/16 in. thicker at the gaging point than the M. C. B. flange.

It is our purpose to have a sufficient amount of metal in reserve in order to enable us to design a chilled iron wheel of 950 lb., or heavier; in other words, we are building for the future. We do not want the limits of the possibilities of the chilled iron wheel confined by the limitations of flange design. We want no unreasonable restrictions in the use of the chilled iron wheel.

In March of this year we submitted to the chairman of the wheel committee of the M. C. B. Association a new set of standard specifications recommending the following:

650 lb. wheel—brake pressure.....19,000 lb.
750 lb. wheel—brake pressure.....32,200 lb.
850 lb. wheel—brake pressure.....40,000 lb.

and detailed drawings of M. C. B. types of wheels and arch plate type of wheels.

There is absolutely no limit of weight in the case of steel wheels, but when it comes to a design of chilled iron wheels, all sorts of restrictions follow. We all know what an additional 25 lb. of iron will do to any of the standard M. C. B. wheels in the matter of drop and thermal test, and the proof of this is manifest in our 625 lb. M. C. B. pattern which we were enabled to re-design in the year of 1909 by the additional allowance of only 10 lb. of metal.

There are some tests which would establish the chilled iron wheel on a much firmer basis and I believe would be advantageous to all manufacturers. The tests that I refer to are comparative tests of the chilled iron wheel and the steel wheel.

1: Relative wearing values when rotating on a steel rail under various loads, the tread wear and flange wear to be observed separately.

2: Abrasion of rail under various conditions of loading.

3: Determination of the intensity of heating stresses in all parts of the chilled iron wheel, namely, single plate, intersection of plates, front plate, back plate, brackets, etc.

4: Analysis of the thermal test. Intensity of stresses in various parts of the wheel, and effect of thickening the thermal ring, increasing and decreasing the temperature of the iron, etc. The thermal test should be made an intelligent one instead of the present crude affair that is supposedly alike for all weights of wheels.

5: Determination of stresses in the hub and plates of the chilled iron wheel due to pressing on axles. Variation in stresses due to various classes of machining.

Coal and Iron in New South Wales.—The total quantity of coal raised in New South Wales to the end of 1914 is estimated at 202,400,767 tons, valued at $380,000,000. The output for the year 1914 amounted to 10,390,622 tons, valued at $18,500,000. The coal exported during the year amounted to 5,868,033 tons, valued at $15,750,000. The quantity of pig-iron made in the State during 1914 from native ores was 75,150 tons, the value of which is estimated at $1,250,000.

Annual Meeting of Railway Fire Protection Association

Abstracts of Papers and Committee Reports on Various Methods of Fire Prevention and Fire Protection

The second annual meeting of the Railway Fire Protection Association was held in the Hotel La Salle, Chicago, on October 5, 6 and 7, with 125 members and guests in attendance. President F. H. Elmore, superintendent of insurance of the Southern Railway, presided, and in his president's address spoke of the enlarging field of the association, and referred to the possibility of the establishment of uniform standards of railroad fire prevention with the association as the authority for the best ideas and methods.

ADDRESS BY T. C. POWELL

T. C. Powell, vice-president of the Queen & Crescent, delivered an address on the importance of fire prevention work, outlining the results of work of this kind on the Cincinnati, New Orleans & Texas Pacific. After the management had been confronted with the fact that the fire losses were increasing and the insurance premiums advancing, it concluded in 1908 a contract for periodical inspection of the entire property. The beneficial effects were shown by the fact that whereas for the three years preceding the contract, the average fire losses were over $23,000 per annum, the average for the next two years was less than $6,000. In the fiscal year 1913 the fire loss was less than $3,000, the lowest for 16 years. Comparing the period during which the road did not have expert insurance inspection, but depended upon general instructions to guard against fire, with that during which it had the benefit of such inspection, Mr. Powell showed that from November, 1902, to June, 1908, $111,495 was paid in premiums, and the insurance companies paid on account of fire losses, $1,717,926, whereas during the period from June, 1908, to June, 1915, inclusive, the company paid in premiums $89,639, while the insurance companies paid on account of fire losses, only $44,750, and by reason of the close inspection the total premium for the year just concluded is less than 60 per cent of what it was 10 years ago, although the property value has increased more than 60 per cent.

The bridge and building department is required to submit to the insurance inspector plans for all buildings erected or additions to or changes in existing buildings, on the theory that if an ounce of prevention is worth a pound of cure, an ounce will go further and be more effective if applied at the beginning.

Abstracts of the committee reports are as follows:

RULES FOR PREVENTION OF FIRES AND PROTECTION OF PROPERTY

The committee on rules for prevention of fires and protection of property submitted a report of which the following is an abstract:

The committee deemed it advisable to make the rules of such a general character that they would apply to and be acceptable by all railroads and deal with hazards that are common to all.

It is believed that the all-important question relating to rules is their enforcement, and we believe this can best be accomplished by securing the fullest co-operation of all departments of the railroad service. Insurance department managers and their inspection forces should work closely with the operating heads in studying the economic side of the waste from fire, and this will most likely lead to a united effort to find the remedy and its application.

Especial heed has been paid to the suggestion of our executive committee, in giving consideration to the causes of fires, in the preparation of these rules. It is our conclusion that the chief causes are carelessness and ignorance, although it is also recognized that the transportation business is attended by hazards that are peculiar thereto. Therefore, these are the hazards that have received most careful consideration at the hands of this committee.

As to the form in which the rules are to be placed before those by whom they are to be observed, it has been found that the most common practice followed by railroads is to print them in bold type on heavy cardboard and post them conspicuously about the premises, and this practical method we recommend in order to best reach the masses of employees. It is also considered most advisable that the language be mandatory, rather than suggestive.

In the preparation of these rules, in view of the close relationship existing between the terms fire protection and fire prevention, it was not deemed advisable to make an attempt to divide them.

To our minds fire prevention deals mainly with arrangement and construction of buildings and the guarding of hazards. Good housekeeping methods should be so emphasized under authority as to enforce a strict compliance. It is the feeling of this committee that too much stress cannot be put upon the importance of looking out for those things that will prevent fires. It should be indelibly impressed upon the mind of every employee that it is his duty to conserve the property by elimination of the fire waste just as it is to prevent destruction by any other agency. It is urged that an active campaign be carried on at all times by the individual roads with a view of ever keeping this subject before the men employed in every branch of the service This can probably best be done by the issuing of circulars or bulletins from time to time by executives, worded in such a manner as to forcibly call attention to these subjects.

The task of creating sentiment in favor of fire prevention is no small one, inasmuch as it calls for a breaking away from habits or practices that have grown to be a custom on account of their long standing. For instance, take that of smoking in and around stations by employees and patrons; these people, as a rule, have a feeling that the prohibition of this privilege is a serious interference with their personal liberty, and that such a rule should not be inflicted upon them. Nevertheless, it is true that many fires have their origin from this very source.

Like the movement for "safety first," it must be shown that those who are called upon to take these precautions are to become beneficiaries in part, at least. It should be clearly pointed out that conservation of property and preservation of life are the things we are striving after. A good point, and one that often carries the argument home to most men in the rank and file is, that lack of employment and consequent financial loss to them invariably follows in case of destruction of facilities.

In this connection we commend to the most careful consideration of members of this association the various bulletins issued last year by the Committee on Hazards—particularly Bulletin No. 1, dealing with care of the property.

In its broadest sense fire protection has a threefold significance and embraces: (1) The means of safeguarding or abolishing causes which originate fires; (2) the provision of means which may confine fire to the space in which it originates, and (3) the adequate means of fire extinguishment.

If it were safe to foster the doctrine that fire protection only has to do with the putting out of fire, it would be a comparatively simple matter to formulate rules under this head. It is considered advisable, however, that the word "protection" be accepted and dealt with in the broadest sense. The necessary means of fire extinguishment, always in readiness for effective service, is the final reserve relied upon when oversight or opportunity to prevent the hazard from starting fire has failed.

In every branch of endeavor, changes are continually taking

place which call for the most careful and thorough study on the part of fire protection engineers in taking care of increased, or entirely new, hazards that continually present themselves. The thought which should be ever present with those in charge of terminals and shop property is that the fire protection must keep pace with the growth and importance of the properties. It too often happens that terminals, shop and other properties are extended and enlarged without a corresponding increase in the fire-fighting facilities. The result is inevitable, for when the conflagration comes, it is soon found that the small quantity of hose, the limited number of hydrants and lack of water spell not only "oversight," but "disaster" as well.

For consideration at the next annual meeting, the committee submitted a draft of 24 rules, which are to be considered as a working basis only and which are to be amplified to meet local conditions by the individual members:

The report is signed by Robert Scott (A. C. L.), chairman; G. L. Ball (A. T. & S. F.); J. S. Rockwell (B. R. & P.); C. N. Rambo (N. & W.); W. T. Witter (So.).

COALING STATIONS

The Committee on Fire Prevention and Protection at Coaling Stations, A. D. Brooks, Illinois Central, chairman, submitted a report classifying coaling stations, describing the construction of the principal types in use, with methods of operation and their hazards, showing how to protect them, how to prevent fires in them, and comparing the life and cost of concrete, metal and wooden stations.

GRAIN ELEVATORS

The Committee on Fire Prevention and Protection in Grain Elevators submitted specifications for the construction of various classes of elevators and their apparatus with a view to eliminating fire hazards, followed by a general discussion of methods of prevention and protection.

COTTON HAZARDS

The Committee on Cotton Hazards, E. B. Berry, Southern, chairman, submitted a report outlining the conditions pertaining to the handling and transportation of cotton and the liability of the railroad for damage to cotton while in its possession. The report also discussed the various classes of hazards for the different kinds of cotton and submitted for the consideration of the association a series of recommended rules for fire prevention in the transportation of cotton. The committee also described some tests of a method of fireproofing cotton bales conducted by the Cotton Protective Company in April, under the supervision of the Oklahoma Fire Prevention Bureau. This consists of dipping the cotton bales in a chemical solution and is intended not only to fireproof the cotton, but to protect it against other kinds of damage. A bale of cotton which had been so treated was brought into the room and lighted matches, cigarettes and cigars were placed on the exposed surface of the cotton with no effect except a slight singeing or charring of the surface. It was stated that under this method of treatment cotton can be dipped and loaded for shipment within an hour, and it is claimed that it can be moved on flat cars as safely as in box cars. The Southeastern Underwriters' Association has offered a reduction in the insurance rates on treated cotton. The committee expressed the opinion that all cotton-carrying lines should co-operate and lend their support to this new treatment, not only for the purpose of reducing fire waste, but the prevention of country damage and dry rot.

OIL BURNING APPLIANCES

The Committee on Oil Burning Appliances, J. S. Richards, Sunset Central Lines, chairman, submitted a set of rules and requirements for the storage and use of fuel oil and for the construction and installation of oil burning equipment, accompanied by a series of plates showing how a safe fuel oil installation can be made. The committee reported that it had been in correspondence with the various railroads with a view to finding just what practices were in effect, and what appliances were being used by the different roads. Particular attention was paid to the manner of installation of the various devices, as well as to the methods adopted in operation relative to the increased fire hazard due to the presence of oil burning appliances in and around various shops. The general rule, particularly in the installation of the oil burning devices, seems to be from the standpoint of economy rather than to minimize the extra hazards created through the use of oil as a fuel, as nearly all of the devices examined were home-made and constructed along the ground lines of those found on the market. There seems to be no set rule in effect governing the size or capacity of the regulating valve, which constitutes a source of increasing fire hazards in that the oil control in some instances is rather crude, relying on the flames to consume the vapor as it becomes atomized, regardless of the fact that the flow of oil and supply could be materially reduced in many cases, and thus effect a saving as well as reduce the fire hazard. The large increase in the consumption of fuel oil by the railroads is due in a great measure to the increase in steel rolling equipment, largely increasing the fire hazard, and it seems important that there should be some set rule governing the installation and use of oil burning devices. The committee recommended the adoption of the rules of the National Board of Fire Underwriters as a standard in the installation of oil burning devices, with one exception regarding its specifications as to automatic stop and drain valve installations.

HAND FIRE EXTINGUISHING APPARATUS

The Committee on Hand Fire Extinguishing Apparatus, N. Searls, Southern Pacific, chairman, submitted a report of its investigation of hand fire extinguishing apparatus, including chemical extinguishers, water barrels and buckets, dry sand and the various forms of hand grenades and dry powder extinguishers. The committee said that only in the most general way could recommendations for any standard be formulated that would satisfactorily meet the various conditions imposed on the railroads of this country. From data secured in reply to questions sent out it was found that all roads agree on the value of the chemical extinguisher and barrels and buckets, 55 per cent of those reporting stating that they do not use this form of apparatus and 50 per cent of those who do use them state that they are not recommended. The bulk of the report consisted of a discussion of the various types of apparatus with recommendations as to the best methods of adapting these forms of apparatus to the various conditions.

TERMINAL CLASSIFICATION AND STORAGE YARDS

The Committee on Fire Prevention and Protection in Terminal Classification and Storage Yards, Gilbert C. Hays, United States Steel Corporation, chairman, submitted a report classifying the hazards as follows:

Common Hazards—Sparks from locomotives; adjacent property; tramps and trespassers; burning rubbish; dry grass and weeds; spontaneous combustion.

Risks—Doors of wooden cars left open; hay; rubbish; straw and paper, etc., left in cars, grass and weeds growing along storage tracks, tramps building fires on floors of wooden cars, smoking, etc., trespassers and small boys playing in and around same; fires from exposing property and storage of cars on dead tracks.

Prevention.—Sparks from locomotives cause many fires in storage, terminal and classification yards, and the following suggestions and rules; which are in effect on the Baltimore & Ohio System, have a tendency to keep down the losses from these causes. Someone is held responsible to see before cars are stored in yards, etc., that all hay, straw and other rubbish has been removed from all wooden cars, and that all doors are closed securely as well as the traps to ice boxes and refrigerators. Rubbish should not be allowed to accumulate about cars stored, and all grass, weeds and small growth should be cleaned out. Cars should not be stored near hazardous risks or where

they would be exposed from the burning of adjacent property.

Where there is a large number of wooden cars subject to a conflagration, they should be set, whenever practicable, so they will be accessible in case of fire for the purpose of either extinguishing the fire or moving the cars out of danger. Ample facilities should be arranged for prompt removal in case of fire.

Cars should never be stored on stub or dead end tracks, they should be uncoupled at least every ten cars and a space of not less than 20 ft. between each cut; also when practicable a row of steel cars should be set between the lines of wooden cars.

The question of providing efficient watchman service should be considered, the watchman should be instructed just what to do in case of fire, the proper persons to notify to procure assistance of locomotives for removing cars should a fire occur. The service of a watchman is possibly most needed during the winter season when tramps are liable to build fires on the floors of stored cars; there is also the opportunity for sparks from locomotives setting fires at all seasons; also the risk from trespassers on the property and small boys playing in and around same. Watchmen should be familiar as to obtaining assistance from city fire department or local brigades if they are available for service.

Protection.—Standard 2-way fire hydrants, 300 ft. apart, on 6 in. mains, with standard hose houses and 300 ft. of approved hose in each house, with nozzles, wrenches, bars, axes, lanterns, etc. (100 ft. of hose to be attached to hydrants at all times and the rest to be laid on shelves), should be installed throughout the yards where possible. A gate valve to be placed with one outlet so that additional hose connection can be made without shutting off the water. All hose connections and couplings should conform with the standard of the city or town in which the plant in located.

Strings of cars should be cut every 10 car lengths entirely across the yards, with an open space of 20 ft. maintained at all times. Cars lacking draw bars and couplings should be chained together to permit the pulling of an entire string in case of fire without breaks.

Switching engines should be equipped with steam fire extinguishing device, such as the Nathan or other devices used by the Rock Island and several other roads.

Water mains should be of the proper size to supply all fire hydrants and laid where practicable in a loop system, eliminating all dead ends. Water should be supplied through fire pumps of sufficient capacity to supply sufficient number of hose streams to compete with large fires. Supply to fire pump should be from two different sources when available. Drilled fire brigades should be organized so as to be familiar with the method of fighting fires.

A more elaborate method of protection is the installation of monitor nozzles on stand-pipes located throughout the yard or terminal on proper size mains, the nozzles so arranged as to be operated by one person or can be left alone. This makes a very efficient protection as it does away with the carrying and handling of hose, etc.

Where this more elaborate protection is not possible, water barrels with two pails to each should be installed 100 feet apart throughout the entire yard, and we especially recommend the installation of the fire pump on shifting engines as being one of the most effective devices.

Summary.—The protection of storage yards is one of the weakest features in connection with railway fire protection, for while a large number of railroads spend thousands of dollars to protect their shop and warehouse properties, little or no provision is made for the protection of car storage yards. In these days of retrenchment it is difficult to obtain authority for spending any considerable amount of money for fire protection purposes, and it is equally difficult to get the operating officers to appreciate how necessary it is to adequately protect a storage yard.

STATISTICS AND FORMS

The Committee on Statistics and Forms, F. R. Austin, Chicago & Eastern Illinois, chairman, submitted statistics based on reports from 41 roads, representing approximately 100,000 miles of line, giving a classification of fire losses, including both railroad property and lading, for the two calendar years, 1913 and 1914. The classification of fire losses by causes is shown in the following table:

CAUSES OF FIRES AND FIRE LOSSES

Causes.	1914 No.	1914 Loss	1913 No.	1913 Loss	Total 2 years No.	Total 2 years Loss	Per Cent.
Adjacent property	314	$191,316.00	291	$131,061.15	605	$322,377.15	5.3
Ashes and hot cinders	122	25,117.79	179	26,095.78	301	51,213.57	2.7
Coal from engine fire boxes	257	93,166.88	236	24,707.95	493	117,874.83	4.4
Electric wires	74	106,722.32	58	87,453.74	132	194,176.06	1.2
Explosions	30	46,503.64	49	26,866.34	79	73,369.98	.7
Forest fires	16	7,251.92	24	31,280.34	40	38,532.26	.3
Fuses	2	52.91	6	2,377.74	8	2,430.65	.1
Friction hot boxes, etc.	61	66,103.72	55	23,938.96	116	90,042.68	1.2
Gasolene, oils, etc.	41	36,445.54	38	18,532.00	79	54,977.54	.7
Heating appliances and flues	523	328,140.78	439	133,320.83	962	561,461.61	8.5
Incendiary	175	150,318.88	174	167,320.83	349	317,798.51	3.1
Lighting appliances	94	350,721.97	113	15,937.14	207	366,659.11	1.8
Lightning	39	16,223.53	44	8,068.21	83	24,291.74	.7
Matches	64	21,543.45	104	27,599.49	168	49,142.94	1.5
Rubbish, burning	67	16,638.97	83	21,410.54	150	38,049.51	1.3
Smoking	108	71,887.65	48	26,924.72	156	98,812.37	1.4
Spark from locomotive	1,529	486,964.95	1,479	412,212.95	3,008	899,177.90	26.7
Spontaneous combustion	213	107,775.13	180	151,077.20	393	258,852.33	3.5
Torches	65	28,158.02	77	29,268.90	142	57,426.92	1.3
Tramps and trespassers	344	153,547.02	180	214,036.93	524	367,583.95	4.7
Unknown	1,180	637,116.93	1,442	867,369.79	2,622	1,504,486.72	23.3
Waste and wooden lockers	12	1,321.25	19	12,614.84	31	13,936.09	.3
Wrecks	61	93,143.29	80	124,271.76	141	217,415.05	1.3
Miscellaneous	246	84,164.70	206	49,409.73	452	133,574.43	4.0
TOTAL	5,637	$3,120,347.24	5,604	$2,633,316.66	11,241	$5,753,663.90	100.0
Average loss per fire		$553.55		$469.90		$511.85	

A second table gave a classification of fire losses by location. Out of a total fire loss of $5,658,232 in two years, $1,639,300 was attributed to rolling equipment. The next largest sources of loss outside of miscellaneous were merchandise in transit, $527,287; shops, buildings and contents, $389,648; elevators, $345,634; and passenger and combination stations and contents.

The committee reported that the gathering and compiling of statistics of this kind by a committee has worked out unsatisfactorily, and recommended that the committee be discontinued and that one person be appointed as a statistician to gather such data as the association requires, and that he be paid for his services.

ELECTRICAL HAZARDS

The Committee on Electrical Hazards submitted a report on the hazards to electric lighting installations, based on the rules and regulations of the National Electric code, which is the accepted standard for electric wiring and apparatus. The bulk of the report was devoted to a discussion of various causes of

hazards and to various types of electrical appliances, giving in parallel columns, the cause of the hazard, the probable effect, and references to the code for methods of remedying the trouble or correcting the defects. The one great cause for electrical fire hazards, the committee found, is poor insulation. The committee recommended that all electrical work be required to be installed strictly according to the rules and requirements of the National Electric code.

The Committee on Locomotive Sparks and Ash Pans Hazards, H. W. Colson, Atlanta, Birmingham & Atlantic, chairman, presented a progress report.

The Committee on Stations, Freight Depots and Warehouses, W. S. Maryon, Southern, chairman, submitted a report, showing that the percentage of loss in this class of property is high, and the destruction entails a loss above the actual value of the property in crippling operation, and resultant loss of revenue. Reports of the committee on statistics and forms read before the meeting, last year, showed a loss for the five-year-period from 1909 to 1913 of approximately $731,000, on stations and warehouses, out of a total of $6,158,000. To these figures should be added a percentage of loss on merchandise in transit destroyed in buildings, bringing the loss on this class of property to about one-sixth of the total. The need of reduction of the loss is obvious.

At the morning session on October 7, the meeting was addressed by F. A Silcox, district forester of the United States Forest Service at Missoula, Mont., on the subject, "The Railroads and Forest Fires."

Following the session on Wednesday morning the association held an informal luncheon at the Hotel LaSalle, and following the afternoon session the members paid a visit to the Illinois Central shops at Burnside. At the Thursday session a series of motion pictures were shown, illustrating a trip through the Underwriters' Laboratories in Chicago.

The officers of the association were all re-elected: President, F. H. Elmore, superintendent of insurance, Southern Railway, Washington, D. C.; vice-president, Paul Hevener, superintendent of insurance department, Rock Island Lines, Chicago, Ill.; secretary-treasurer, C. B. Edwards, fire insurance agent, Mobile & Ohio, Mobile, Ala. C. S. Sherwin was elected in place of W. L. Lawrence, of the Delaware & Hudson, on the executive committee.

WHAT THE COMMERCIAL AGENT CAN DO FOR THE SHIPPER*

By Carl K. Landes

General Agent, Freight Department, Minneapolis, St. Paul & Sault Ste. Marie, Cincinnati, Ohio

For the purpose of this discussion the designation commercial freight agent must necessarily embrace every one engaged in the solicitation of freight. The contracting agent, the traveling freight agent, the commercial agent and the general agent are all working in similar ways to secure freight for the railroads.

To the question, "What can a commercial freight agent do for a shipper?" the answer is, "Manifest always a beneficent interest in the shipper's welfare, and try to be of helpful, practical service:

"By tracing shipments when requested to do so and giving replies promptly enough to make them of real value.

"By working for the quick settlement of all just claims that are brought to his attention.

"By endeavoring to interest the railroad purchasing agent in a manufacturer's product, to the mutual advantage of the shipper and the railroad when both believe in reciprocity.

"By furnishing, when possible, advance information regarding contemplated changes in rates and rules.

"By co-operating toward the adjustment of unfair rate conditions.

"By suggesting names of possible users of the product of a factory.

"By helping the shipper to secure equipment without unnecessary delay, and as business continues to improve the value of this service will increase in proportion.

"By supplying information regarding export tariff, customs duties and regulations governing shipments to foreign countries.

"By furnishing shippers with estimates of prospective business conditions throughout the territory traversed by his road."

This might be an opportune time to say that those who are interested in the Northwest should prepare to take advantage of the improved business conditions which soon will prevail in that section. The grain crops in the northwestern states of Minnesota, North and South Dakota and Montana are enormous, and the Soo Line alone is making preparations to handle 75,000 carloads of grain. At prevailing prices such a crop ought to distribute about $70,000,000 among farmers located along our line. This money possibly may be spent by the farmers principally for automobiles, but other commodities also will be in great demand, and the thing to do is to be prepared to supply the demand.

Shippers, I think, generally understand that a commercial freight agent's office is equipped to furnish information and supply service along the lines mentioned, and that the commercial freight agent is earnestly desirous that shippers avail themselves as often as possible of the facilities of his office.

The visitor to Havana is struck by the frequency with which he encounters the mysterious sign reading simply—"Ask Mr. Foster!" but the mystery clears somewhat when he learns that "Mr. Foster" has his agents posted at different public places throughout the city, and that those agents are specially equipped to give the uncertain tourist definite information regarding all rates, routes, departures and arrivals about which the tourist may inquire. These agents also carry a full line of tickets to the good theaters or, for that matter, to European and Asiatic ports of call, and are instructed to endeavor to sell each tourist at least one of these tickets before allowing him to leave.

Now, I should like to have pasted upon the wall of every shipper's office a sign reading, "Ask the commercial freight agent," just to remind shippers to avail themselves of our facilities to furnish information and, incidentally, afford us an opportunity to ask for the privilege of demonstrating our ability to handle carloads and less than carloads with promptness and despatch.

Commercial freight agents of all other lines feel the same. All are anxious to be of service, realizing that to secure and hold business they must be courteous, considerate and willing to co-operate with the shipper in any just and laudable enterprise.

This attitude of the commercial freight agent is simply a reflection of the attitude of the present-day progressive executives of our most efficient railroads, and is in direct contrast to the old "Public be damned" policy that may have prevailed during earlier days, but fortunately exists now only in history.

The efforts that are now being made by many railroad executives to impress patrons with their sincere desire for harmonious relations are pronounced, practical and costly. Sir Thomas Shaughnessy, president of the Canadian Pacific, in a recent address to employees, impressed upon them that while they should continue to labor devotedly and loyally for the intelligent advancement of the company's affairs, they should never forget their duties to the public and should be unfailing in courtesy.

The slogan of the Soo Line is—"Safety and Courtesy Always!"

The Santa Fe recently has inaugurated what is called the "Harmony Special." One week in every month some of the officers, including the president, vice-presidents, general manager, freight, passenger and publicity agents, are drafted for a trip over a division of the road. The train stops at each station long enough to permit the officials aboard to talk with the patrons of the railroad. E. P. Ripley, president of the Santa Fe, recently stated that the "campaign was a success from the start and that now it is part of every official's duty to perform a harmony stunt when occasion demands."

So you see the officials of the railroads, from the highest to the lowest, want to be the friends of their patrons and they want their patrons to reciprocate their friendship.

* An address before the Traffic Branch of the Cincinnati Chamber of Commerce, on September 13, 1915.

Once upon a time there was a man who started out to make friends among his fellow men by resolving that for three months he would say something good about anyone whose name happened to be mentioned in his presence. He kept his resolution and he made hosts of friends. Therefore, I am going to ask you to resolve for the next 90 days to say something good about every railroad that is mentioned in your presence.

I. C. C. ACCIDENT REPORTS

The statistical office of the Interstate Commerce Commission may be supposed now to be wrestling with the mass of facts which, under the revised regulations, have been reported to it concerning accidents on railways during the month of July, 1915, the first month in which the new rules were in effect; and the results when summarized will show some figures which will tax the capacity of the statistician's adding machine; figures showing the number of hours that employees of the railways have worked during the month. This requirement of a statement of "man-hours" and of train and locomotive mileage is responsible for the most noticeable addition to the list of facts called for by the new rules. Regardless, however, of the substance of the reports, the changes in form have imposed an immense amount of work on the railroad clerks who make them out..

MONTHLY REPORT OF RAILWAY ACCIDENTS. **T**

Name of reporting carrier (1): Oakland & Eastport R.R. — Report to the Interstate Commerce Commission for the month of: July, 1915

Carrier's division (2): Eastern — Carrier's number (3): 401 — Date of accident (4): 23 — Time of day (5): 11 am — I. C. C. class (6): S 1 — I. C. C. No. (7): 31

Place of accident: Name of State (8): N. Y. — Nearest station (9): Smithville — Nearest milepost (10): --- — Estimated distance and direction from milepost named (11): ---

Kind of accident (12): Crossing — Clear, cloudy, or foggy? (13): Clear — Raining or snowing? (14): --- — Daylight or dark? (15): Day

Cause (briefly) (16): Struck at Peters' Crossing while driving automobile across

Kind of train involved (17): Milk — Train No.: 850 — Engine Nos. (18): 451 — Direction (19): W — Speed (20): 30 m. p. h.

(21) DETAILS OF CASUALTIES TO PERSONS.

Name and address of person. (a)	Class of person. (b)	Nature and extent of injuries. (c)	Days disability. (If killed, so state.) Actual. (d)	Probable. (e)
22				
23 A. Robinson	K	Contusion of hip		20
24				

50. COST: (a) Equipment, $ — (b) Track, $ — (c) Clearing wreck, $ — (d) Total, $ ----

51. Detail of, cause, and nature of accident; circumstances, estimate, and description of damage to property; responsibility and experience of employees responsible. When not manifestly immaterial, give number of cars in train (loaded, empty), percentage of air brakes operating, and gross weight in tons. If space below is insufficient, use the reverse of this sheet.

Form T, Government Accident Reports; Size of the Whole Blank, Eight and One-Half by Eleven Inches

Here reduced one-eighth in width, and space for answer to question 51 cut off.

The style of the principal blank, form T, is shown in a facsimile printed herewith, filled out with a statement, slightly disguised, of an accident that occurred in New York State in July. An examination of this form will give an idea of the character of the present requirements.

In the answer to the sixth question, the letter *S* indicates that this is a train service accident, and *i* indicates that the victim was struck by a locomotive or car at a highway grade crossing. The capital letters used in this place on the blank are C, D, B, L, M, S, meaning respectively collisions, derailments, boiler accidents, other locomotive accidents (not involving collisions or derailments), miscellaneous train accidents and train service accidents. "S a" would indicate an accident to a man engaged in uncoupling air and steam hose or safety chains; "S b" an accident while coupling or uncoupling cars; "S t" insufficient clearances; "S d" getting on or off cars, etc.; "S e" falling from cars, etc.; "S f" miscellaneous accidents to employees on duty on or about a train in connection with its operation; "S g" miscellaneous accidents, on or around trains, to persons other than employees.

The statement of the cause, question 16, is to be taken as a catch line, the full statement being entered under question 51; but in this case question 51 is left blank, the person making out the report having concluded, apparently, that the accident was not of sufficient importance to call for further detail. The legal department of a railroad, which always must gather all possible facts which may be needed in case the victim of an accident should sue for damages, would, of course, require, in a report like this, a considerable list of answers throwing light on the circumstances attending the accident; but these would have no particular value for the Interstate Commerce Commission.

In column *b*, under question 21, the letter *K* means that the person injured in this accident is to be classed among "Other non-trespassers not on trains." The letter *A* in this column would indicate employees on duty; *B* employees not on duty; *C* passengers on passenger trains; *D* passengers on other trains; *E* passengers not on trains, and so on. Class *A*, employees on duty, is divided into 68 sub-classes. For example: (1) general officers $3,000 per annum and upward; (2) general officers below $3,000 per annum; (6) clerks, below $900 per annum, except sub-class 37, telegrapher-clerks; (20) electricians; (31) em-

ployees in outside agencies, except numbers 5, 6, 7 and 30. Sub-class 7 includes messengers and attendants, and sub-class 30 traveling agents and solicitors.

Question 51 calls for substantially the same information that has been required by the old forms, the chief difference being that heretofore the superintendent responsible for the report had considerable freedom to use his own judgment as to the extent to which he would explain the details, except in the more serious accidents; whereas, according to the regulations as now formulated, much detail is required in the case of every accident reported, no matter how relatively unimportant it may be.

Besides form T there are three others, F, R and V. Form F is a monthly statement of fatalities developed from previously reported injuries. Form R is a supplementary report to accompany form T, in the case of an accident due to a broken rail, calling for all available facts, under 39 heads, which may serve to explain the cause of the breakage of the rail.

Form V ("verification"), one to be sent in for each month, contains the oath of the officer sending the report, and a comparative statement showing the total number of non-train accidents happening during the month and the number of casualties resulting therefrom. For these accidents no form T report is required. Form V divides persons into six classes, namely, shopmen, stationmen, trackmen, bridge and building men, other employees, all other persons, and 11 classes of accidents (or causes), as follows: 71, working machinery, engines, motors, etc.; 72, transmission apparatus, belts, gears, shafting, ropes, etc.; 73, use of hand tools, apparatus, etc.; 74, flying particles; 75, explosives, inflammable, hot or corrosive substances; 76, electric currents; 77, collapse, fall, etc., of objects; 78 falls of person; 79, handling rails, ties, bridge timbers, etc.; 80, handling freight or supplies; 81, miscellaneous industrial causes.

At the bottom of each column, following the total number of killed or injured in that column, there is a space for the total number of "man-hours," that is to say, the aggregate number of hours worked during the month by all employees subject to industrial casualties in the classes named; and following this a statement of the average number of casualties per million man-hours.

Judging by the figures compiled by one New York railroad it may be estimated that the total number of "man-hours" reported by the railroads of the whole country for the month of July will aggregate about 393,359,950. Apparently the number of hours worked by these men on the railroads of America in a year will, therefore, aggregate between four and five billions; or, in a period of more active business, perhaps more than the larger number mentioned. These figures represent, it is to be remembered, only those employees who are subject to the classes of casualties named in the 11 items quoted above. As item 78, "falls of persons," covers a class of accidents to which almost everybody is liable, it would seem that these figures ought to include employees in every department. On the road above referred to 31 per cent of the hours reported were those worked by shopmen; 5 per cent by stationmen; 34 per cent by trackmen; 9 per cent by bridge and building men and 21 per cent by other employees.

From the standpoint of the railroad (as well as in the interest of all students of the records) uniformity, as between the federal and state regulations, is an important desideratum in the compilation of these reports; and this fact seems to be receiving increased appreciation. By inquiry of the different commissions we find that eight states—Colorado, Maryland, Montana, New York, North Dakota, Pennsylvania, West Virginia and Wisconsin—have taken or intend soon to take action to make their requirements in regard to railroad accidents correspond to those of the federal government. The rules of the Interstate Commerce Commission now call for such full, complete and detailed statements of every accident which is of public interest in connection with the question of the safety of railroad travel and operation that, without doubt, every state can get all the information reasonably needed for the state records by asking for carbon copies of the reports sent to Washington. An order providing for the acceptance of these carbons would, therefore, seem to be reasonable in any state; but, as we see, only eight states have explicitly declared themselves on this point up to the present time. In a number of other states the requirement of the regulations is (in less detail) for about the same facts as are called for by the Interstate Commerce Commission's rules, but on blanks in which the details are differently arranged. This difference adds to the railroads' clerical work, while affording very little advantage; none at all so far as the outside observer can see. The officers of these states, however, in most cases, seem very scrupulous in their determination to suffer no derogation of the dignity and independence of their respective states. Quite likely, however, there will be other states which will fall into line with the eight above named. In Arizona it is understood that the Commission intends to accept reports made according to the I. C. C. formula. From a number of states no answer has been received to the inquiry which we sent. In Oregon all statistics of accidents now go to the Industrial Accident Commission.

This article has to do with the forms of reports. As to the substance of the information that belongs in a report of this kind—what amount and what kind of information is worth giving—there are numerous unsettled questions. The question as to how the different states will settle these details—or whether they will be left unsettled, as has been the situation in a number of states in the past—is an interesting one. Possibly the results of the operation of the Interstate Commerce Commission's plans may, in the next few months, throw some light on it.

REPRESSING TRESPASSERS ON THE NEW HAVEN

The New York, New Haven & Hartford is keeping up a vigorous campaign for the discouragement and prevention of trespassing on the tracks of the company. Signs to the number of 10,000 have been posted along the company's lines, warning all persons not having business on the premises to keep off. Renewed efforts have been made to obtain the active co-operation of magistrates, prosecuting officers and other local authorities. School superintendents and proprietors of factories have been called upon to render active assistance wherever possible.

Saving Time or Saving Life?
Saving time sometimes means losing life.
A few minutes saved by walking on or crossing railroad tracks may mean your permanent disablement or death.
Five thousand, four hundred and seventy-one persons who trespassed on railroad property in the United States in 1914 were killed.
Every life so lost is an economic loss to the community.
Trespassing on railroad property is forbidden because of the danger it means to YOU.
You can reduce this annual waste of human life by not trespassing on the railroad tracks and right of way and by urging others not to do so.
THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD CO
DANGER OF Trespassing on the Railroad
TRESPASSING on railroad property costs almost as many lives in a year in this country as does the dreadful disease of SCARLET FEVER.
The estimated number of deaths from SCARLET FEVER in the United States in the year 1912 was 6,030.
The number of persons killed while trespassing on the railroad in the year 1914 was 5,471.
Most of those who fell victims to this dreadful disease were unaware of the danger they were in and thus could not avoid it.
Those who were killed while trespassing on the railroads could have avoided the danger they were in, but failed to do so.
Every time you TRESPASS on the railroad you are putting your life knowingly and needlessly in danger.
AVOID DANGER WHEN YOU KNOW IT IS AROUND.
THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD CO.

Typical Bulletins Used in the New Haven Campaign to Discourage Trespassing

With a view to agitating the subject from every possible angle a half-dozen different bulletins have been prepared setting forth the dangers of trespassing in such a way that he who runs may read. About 180,000 of these placards are to be posted. Facsimiles of two of them are shown herewith

Railroad Locomotive Repair Shop Organization

Efficiency and Output Can Be Considerably Increased By Giving More Critical Attention to This Feature

By Henry Gardner

The old-fashioned railroad shop organization is well known; it consisted of a shop superintendent, or master mechanic, followed in line by an assistant superintendent and general foreman and a number of shop foremen, one for each department. In a shop of this kind the superintendent, assistant superintendent and general foreman have to bear all the burdens of administration and supervision; frequently there is no assistant superintendent in the organization, the whole load being carried by the superintendent and general foreman. Under this type of strictly line organization there are great possibilities for a glaring waste of time and effort by the supervisory force. These overloaded officers, continually goaded for output, must at the same time hold discipline meetings every day and must pass on all applicants for employment; they must be familiar with all piecework schedules and continually add new prices; they must see that all belts, motors, machines and cranes are kept in repair and must handle the apprentices, constantly instructing and moving and encouraging them.

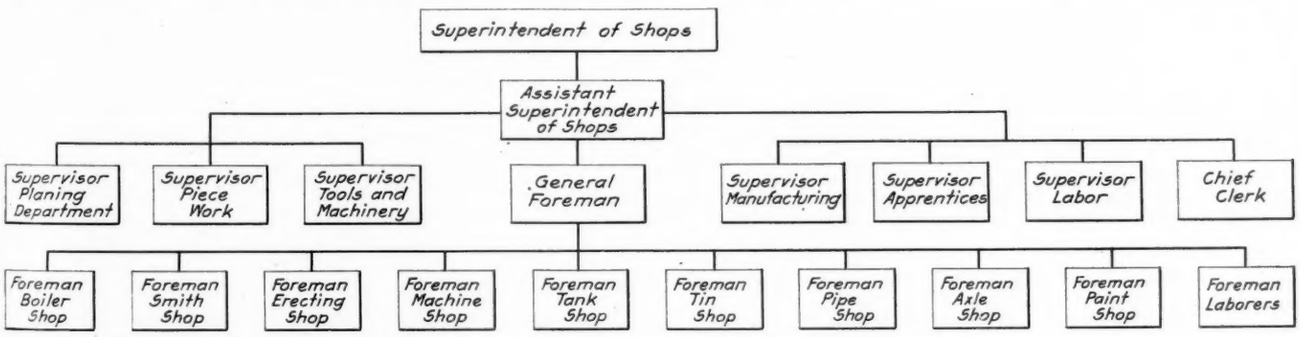
It is safe to say that no one man, or three men, can do justice to all of these duties in a shop of any appreciable size, and it is a foregone conclusion that they will frequently overlap one another in the performance of their work. An instance is recalled where three men in an old-fashioned line organization shop went over the same ground daily, one after the other, and often it was found that a sub-foreman had been told to do the same thing by each one of these three men in succession.

In the majority of railroad shops to-day the strictly line organization is in effect; there is no attempt made to plan, schedule or despatch the work in the various departments and almost any foreman can hire or discharge men, with or without just cause. The result of this state of affairs is as might be expected—low output, great waste of labor and material, with a high cost of repairs, and a general lack of system and order. The machine equipment is neglected or repaired in a makeshift manner and the money wasted in misuse and abuse of belting alone would pay for many new machines in a year. Cutting tools are dressed and hardened by guess, by the eye; no such thing as an electric furnace or a pyrometer is known.

In this same hypothetical but very typical shop, apprentices, if hired at all, are exploited by being kept on one machine for a year or more, and no serious attempt is made by any one to properly instruct them. If the shop is run on a day work basis the supervising officers must be constantly on the move to maintain the output; if the shop uses piecework to any extent an eternal personal vigilance must be exerted to keep up the quality as well as the quantity of output. These old-fashioned practices are now conceded to be wholly inadequate, especially for the larger shops, and the strictly line organization must give way to the composite line and staff organization if the maximum quantity and quality of output, at a minimum cost, are to be obtained.

A proper organization for a large railroad locomotive repair shop is shown by the accompanying chart. Here is a combination line and staff organization. The superintendent of shops has an assistant who has a general foreman next in line in charge of all departments, as is customary. But the staff is the vital part of the whole organization, and is directly responsible for the economic and effective management of the entire plant; the line, below the superintendence, is wholly in charge of output.

On the staff are six supervisors and a chief clerk as follows: A supervisor of piecework, or other wage payment system; a supervisor of routing, scheduling and despatching in all departments; a supervisor of apprentices whose important duties are well known; a supervisor of tools and machinery in charge of the repair and purchase and installation of all new machine and hand tools, cranes, etc., about the plant; a supervisor of manufacturing who is in direct charge of all shop orders and manufactured material either for outside shops and enginehouses or for local consumption and stock, and finally a supervisor of labor, whose office may be called the employment department; this man employs and discharges all men and administers discipline for all employees in and about the plant. The duties of the chief clerk are well known and established. The form of organization shown by the chart is distinctively up-to-date and is representative of tried and successful types. With this arrangement the several and specific duties of each staff man are carefully defined and all overlapping and doubling of work by the supervising force is eliminated.



An Ideal Form of Organization for a Large Locomotive Repair Shop

The first duty of the superintendent of a locomotive repair shop is to study quantity and quality of output. He should spend at least three-fourths of his time on this work, if he is to actually earn his salary. All clerical work, letter writing, etc., performed by a shop superintendent is a dead loss to the railroad and nine-tenths of this work should be turned over to his assistant and his chief clerk. A railroad shop superintendent has been known to spend an entire day with hammer and chisel and file surrounded by a loyal and admiring group made up of the assistant superintendent, the general foreman, the erecting shop foreman, the machine shop foreman and two skilled mechanics. But what became of the shop and the departments controlled by these men during that day? Obviously the loss to the company measured in dollars would be considerable.

The modern railroad shop superintendent must be more than a practical man and a good handler of men; he must be a superintendent in the same sense of the word as applied to similar positions in the strictly manufacturing shops. What else is a railroad

shop but a manufacturing plant, and how is it in any way different in so far as opportunities for saving and economy are presented? The shop superintendent should spend a part of his time planning and developing original and improvement work and he should have available up-to-date records of the output in all departments and should keep close watch over the cost of repairs. In connection with these duties the following records are suggested for the superintendent's office; these may be expanded or modified to suit local requirements, and they are better made in chart form, as a graphic diagram gives accurately an exact picture of conditions which cannot be so impressively presented in any other manner.

For a nine-hour day these formulae should be worked out each month and platted in diagram form:

(1) $\frac{\text{Total engines out per month} \times 9}{\text{Total man-hours per month.}}$ = Engines out, per man, per day.

(2) $\frac{\text{Labor cost (payroll) per mo.} \times 9}{\text{Total man-hours per month.}}$ = Labor cost of output per man per day.

(3) $\frac{\text{Material cost per month} \times 9}{\text{Total man-hours per month.}}$ = Material cost of output per man per day.

(4) $\frac{\text{Labor cost per month}}{\text{Engines desp. per mo.}}$ = Labor cost per engine despatched.

(5) $\frac{\text{Material cost per month}}{\text{Engines desp. per mo.}}$ = Material cost per engine despatched.

(6) $\frac{\text{Man-hours per month.}}{\text{Engines desp. per mo.}}$ = { Number of hours it takes one man to turn out one locomotive.

The above six formulae may be further subdivided to include each separate shop or department as the need for such data arises, or if a special study of some one department appears to be demanded by lowered output or faulty conditions. The percentage of material and labor costs should also be carefully watched and a chart may be made to show this each month. For example, the total material cost for all repairs for one month may be $30,000, and the corresponding labor cost $50,000. From this it is evident that material costs are running 37½ per cent. of total and labor costs 62½ per cent., which may be considered a fairly good condition for the average shop to-day.

As indicated by the organization chart the responsibilities of the assistant shop superintendent are the same as the superintendent, since in the event of the superintendent leaving suddenly or gaining a promotion the assistant superintendent should immediately fill his superior's position without appreciably disturbing the organization or the quantity and quality of the output. The duties of the assistant superintendent should be primarily to run the shop and get the required output. He should study and arrange for the charts and data required by the superintendent and should aim in every way to run the entire plant as if his superior were not there to supervise him. A great deal of time is wasted by shop superintendents and their assistants in habitually walking about the plant visiting every department superficially each day. The gain to the shop as a whole by this procedure is practically nothing. Many a railroad shop superintendent and his assistant walk miles, day after day, conscientiously going over the same old beaten path at about the same hour at least twice each day; the foremen and workmen anticipate the visits and, of course, are all on their best behavior.

The most important duty of an assistant superintendent in any organization should be to make an exhaustive study of each department of the shop; say the boiler shop, to start with. He should turn over all other routine duties to the chief clerk and staff men and general foreman and live for a month in this department, working with the foreman as his assistant, in a sense, for the entire day, if it be from 7 a. m. to 6 p. m. In this way an exact knowledge of details may be obtained and faults corrected or eliminated which otherwise would never have been even seen. A close, individual, departmental study of this kind has never failed to result in a great reduction in manufacturing costs as well as an increase in general effectiveness and frequently a decrease in payroll as a by-product. If a month cannot be spared, two weeks, or even one week, spent by the assistant superintendent in each and every department of the plant each year will work wonders. Finally, an up-to-date shop superintendent, as well as his assistant, should visit other shops frequently and keep constantly posted as to the best methods and practices; they should also read the technical papers carefully, always watchful for labor saving devices and methods for cutting costs and eliminating wastes.

Next in line to the assistant superintendent is the general foreman. He is one of the most important men in the organization, and his duties have wholly to do with the prime object of running the shop, viz., to deliver repaired locomotives. He must be of an extremely active or motive type and must have exceptional ability for instructing and handling men and increasing production. The general foreman works with the seven staff men as occasion arises, in an advisory capacity, but he does not report to any of them or direct them. The general foreman runs the shop with a line and staff organization, exactly as in the old-time line organization, with the exception that a multitude of duties are removed from him so that he becomes virtually an output specialist.

The general foreman and the supervisor of the planning department should be closely allied and preferably their offices should open together so that the daily delay reports may be taken up at once by the general foreman and the causes traced and rectified. It is good practice for the supervisor of the planning department to give the general foreman a slip each morning stating the number and class of repairs of engines that are to be brought in, and it is the duty of this office to see that the departments are at all times equalized. The duties of the staff men are indicated by their titles; the scope of this article will not admit of further details.

The form of force organization required below the general foreman is so varied and depends so much upon local conditions that it must be sufficient to give simply a few general suggestions. The writer has made more than fifty individual charts for a single plant, illustrating departmental apportionment of skilled mechanics, shop hands, or handy men, and laborers; each shop must work these details out for itself—no hard and fast rules can be laid down. Great care should be taken to organize the working gangs with the proper proportion of skilled and unskilled men. Do not have sub-foremen, if needed at all, with no men reporting solely and directly to them; a sub-foreman, or assistant foreman, should always have full authority to direct the men under his charge. Workmen should not be required to report to or receive orders from more than one man, if friction is to be wholly eliminated. The working forces should be divided into small gangs under working leaders, which is better than dividing the whole responsibility between two or three leading foremen; this arrangement will cut down the cost of supervision and place the responsibility and supervision more nearly where the work is actually performed. Specialization is undoubtedly correct for the railroad shop and it must be developed to the fullest extent in every department. Making one man responsible for one class of work not only increases his earnings and his interest in his work, but it enables him to do the best work in a manner satisfactory both to himself and to the railroad. Over specialization is preferable to under specialization.

There is always some discussion as to the relative merits or demerits of two well-known forms of erecting shop organization. The first aims to have the pits divided into blocks of six or eight pits and places one foreman in charge of each block. The other method considers the whole erecting shop as a unit, and has the foremen in charge of gangs, which do special lines of work, and travel up and down over the entire shop, visiting every pit in the order that the work is required. In a shop using a scheduling and despatching system, the former organization is preferable, since accurate comparisons of output for each foreman may be obtained and platted from month to month and a close supervision of his record is very stimulating; moreover, a friendly and healthy rivalry is maintained, thereby keeping up that all-important enthusiasm and "esprit de corps" which, after all, is the great fundamental cause for human excellence. Engines coming into the shop should be divided equally between the foremen as far as possible, so that no one man will obtain unfair advantage

due to the improper selection and distribution of the repairs.

More important even than the distribution of the force organization of a railroad shop is the planning and despatching department in charge of one of the staff supervisors, reporting to the assistant shop superintendent. The work of planning for the admission of engines to the shop naturally assumes more importance than the correct placing of forces, since it is easily possible to bring in too many engines requiring one kind of repairs and thereby disarrange and disorganize the most carefully planned and effective grouping of forces which may have been established to meet certain fixed conditions. The balance of a shop plays a most important part in its successful and economical administration and this is where the supervisor in charge of scheduling and despatching comes in; he must, as far as possible, keep the ratio of classified repairs constant and change that ratio only as may be necessary to prevent overloading some department which may have unexpectedly fallen behind.

For example, let us assume that a shop has been very carefully organized, a man clipped off here or added there until the entire plant is working at maximum efficiency. Then let us assume that 45 per cent of all engines turned out are to have new fireboxes, that 15 per cent are to have new cylinders, that 10 per cent are to have one or more new fireboxes or flue sheets, and that 30 per cent are to receive simply general repairs to machinery with flues removed and safe-ended and with tires turned. Now let us suppose that the exigencies of the service make it impossible to obtain for this shop more than 20 per cent of engines needing general repairs and that 55 per cent of all engines arriving need new fireboxes, and that 25 per cent need new cylinders; what, then, for the time being, has become of our carefully planned organization both as to men and machines? The intelligent selection of engines has a very noticeable effect on the cost of repairs as well as on the mean output; this is much more apparent in large shops where the organization is less flexible and usually highly specialized.

A locomotive repair shop is primarily a plant for manufacturing and maintaining power units needed for marketing the commodity, transportation, which the railroad company sells to the public, and in order to enable the company to sell its product to the best advantage the shop must at all times be ready to supply the operating department with the locomotives needed. This demand for power varies appreciably with the seasons and other causes, national and international, so that it is not always possible to keep a fixed percentage of engines of certain classes available for shopping, which have also made their required mileage in service. The division superintendent and the superintendent of motive power should, however, co-operate closely with the local shop management, as no shop can deliver a constant maximum output from month to month which will satisfy the operating officials if it is not properly supplied with the kinds of repairs for which it has been organized. The ideal state of affairs exists when engines come in for repairs in a constant flow from month to month, and there is in normal times for every railroad a nearly constant direct ratio between the number of locomotives in service and the number requiring repairs; so far as conditions will allow, this ratio should be maintained.

Planning, scheduling and routing and despatching may be depended on to suggest and create the force organization needed. To a degree the organization will automatically adjust itself to the many variable working conditions so plainly brought to light by the accurate records resulting from the systematic scheduling and routing and despatching of all operations and material through all departments of the shop. With one well-known form of modern routing system the use of the despatch board tells at once which department is late or ahead and, provided the shop is using the normal repair ratios, suggests the changes in organization or equipment necessary to build up a department and consequently equalize the shops. The best shop organization can make but an outward show of efficiency without a planning department as outlined. To the casual observer the shop may be speeded up to its maximum intensity, but a careful analysis of conditions will soon expose many weaknesses and wastes of labor and material.

Modern combination staff and line organizations must be more generally employed if our railroad shops are to keep pace with the increasing demands made by the management for reductions in maintenance costs needed to offset government regulation of freight rates and the ever-increasing demands of organized labor. Finally, the statement may now be made authoritatively that increases of output up to 25 per cent have been recorded in several large railroad shops using in greater part the modern organization described in this article, and it is conclusively beyond argument that similar or greater increases in output, with consistent decreases in labor and material costs, may be assured to any large railroad shop whose officers and their superiors have the foresight and courage to adopt these correct principles.

CLOCK-WORK TIME-LOCK FOR ELECTRIC INTERLOCKING MACHINE

On the "Model 2" unit-lever interlocking machines used at the Grand Central Terminal, New York City, there are now in use a number of clock-work time-releases or time-locks, made by the General Railway Signal Company, which are so simple and compact that all of the machinery for a release is enclosed within a box fixed on the top of the lever which it is to govern, the whole being no wider than the body of the "lever"; and the operation of the releases during a period of 12 months has been so satisfactory that all other devices for this purpose heretofore used at this interlocking are declared to be inferior.

The time release performs the function of a detector bar or

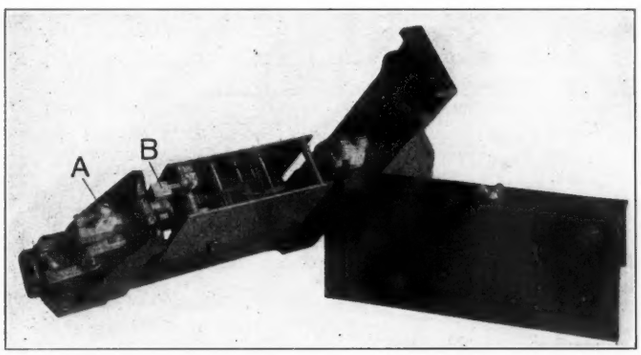


Fig. 1—Clock-Work Time-Lock for "Model 2" Unit Lever Interlocking Machine

detector track circuit; or, rather, it lengthens the time limit which ought to be imposed by a given detector circuit. For example, at D V interlocking, Spuyten Duyvil, 10 miles out from the terminus (see diagram), there is a release on the lever for signal 73, which signal, when cleared, gives a route from *A*, Track 6, through switches 81, 83, 85, 87 to *B*, Track 4. When a train makes this movement the arm of signal 73 can go back to the normal or stop position as soon as the engine passes it; and, without the restraint imposed by the time release mechanism, the lever also could be put back to normal. But the distance from switch 81 to switch 87 is so great that, before a slow train could reach, say, switch 85, an absent-minded signalman, having put lever 73 normal and having thereby released the mechanical interlocking, could move switch 85 in front of the train and thus turn it on to Track 2, which might be a dangerous movement. The time release therefore by deferring the restoration of lever 73, for, say, 35 seconds, serves for that length of time the same purpose as a detector bar extending from signal 73 to Track 4.

The clock-work apparatus is adjustable, so that any desired interval of time may be interposed, after the signal arm has been restored to the normal position, before the lever can be restored fully to the normal position.

The apparatus is fixed on the upper part of the signal lever

in the machine. A cam surface engages with a plunger and, through the medium of a rocker arm, forces the locking member to the locked position. Arranged in suitable relation to the rocker arm is another arm which drives the timing mechanism. In this arm is an adjustment screw *A*, Fig. 1, which determines the distance that the timing mechanism can be moved. Provision is made for adjusting the time from five seconds to two

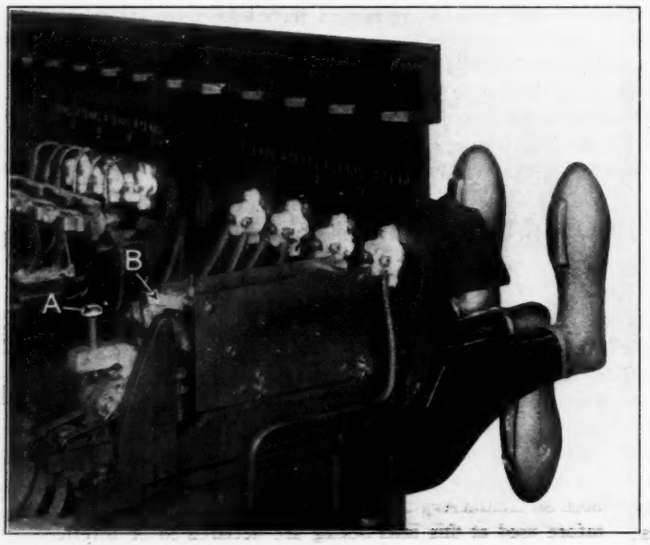


Fig. 2—Clock-Work Time-Lock

minutes. The moving of the lever from normal to reverse causes the lock plunger to move to the locked position, and it is latched there; and at the same time the lever winds up the spring in the timing mechanism, setting it forward the amount determined as proper for that particular application, this being in all cases fixed as may be determined locally in each case.

The mechanism remains in this position during the time the lever is reversed. When the lever is moved to the normal indication position the plunger on the rocker arm is free to drop into the depressed portion of the cam, on the lever; and the mechanism is left free to be driven backward by the action of

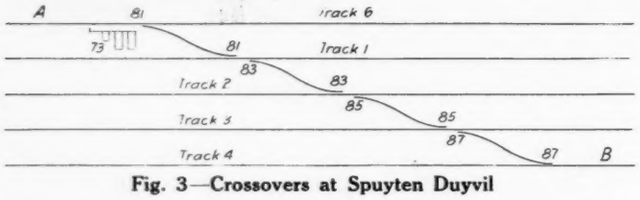


Fig. 3—Crossovers at Spuyten Duyvil

the spring, which was wound up at the time the lever was moved to the reversed position.

At the expiration of the time limit, the clockwork mechanism has moved to a point where it releases the latch (*B*, Fig. 2) which has been holding the lock plunger in engagement with the lever. The plunger is then snapped out by the action of the spring.

It will be noted that the locking plunger is not only forced into the locking position, but that the plunger remains in the full locked position until the end of the time interval. There is thus complete uniformity in action and no tendency to round the corners of the plunger or of the locking notch in the lever.

This device is so designed that it is mounted on the top of the lever guide in the same manner as the electric lever locks, without any change in adjacent parts. In this particular installation the device is used solely as a mechanical time lock; but it can with slight changes be made to close or to open electric circuits in conjunction with switch locking.

A cover is provided for the protection of the parts. It is shown (off) in Fig. 1. It can be sealed so that the adjustment cannot be altered by unauthorized persons. The device is operated independently of the indication mechanism and, therefore, the indication system may be either battery or dynamic.

For the foregoing information and illustrations we are indebted to H. S. Balliet, signal engineer of the electric division of the New York Central.

PROPER MANAGEMENT OF FREIGHT-CAR SERVICE*

By J. R. Cavanagh

Superintendent of Car Service Cleveland, Cincinnati, Chicago & St. Louis

I still believe that a general car pool, under the joint jurisdiction and supervision of the American Railway Association, the Master Car Builders' Association and the general traffic associations, would produce excellent results; especially if a scheme could be worked out for making all car repair shops "pool" shops so that when cars come into the "pool" shops they will be brought up to a certain unit of standardization. It should be arranged that none of the lines, parties to the pool, shall individually add any cars to its equipment except through the pool organization, and ownership should be based on a percentage (interest in the pool) basis, or as may be agreed upon.

For illustration: If the Kansas City Southern owns 11 per cent of the box car equipment and desires to increase its allotment to 15 per cent, and it could be shown that this was necessary or reasonable, the board of directors would so approve, and the Kansas City Southern could then add such additional box cars to its allotment as would increase its percentage to 15. If, however, it could be shown, by the board of directors, that such increase on the part of the Kansas City Southern was not necessary, or would be met by a general increase in the equipment of the pool, the Kansas City Southern would be charged with an additional 2½ per cent as against the 4 per cent which it desired to add, on the theory that it would get the benefit of the increased percentage of the other members of the pool in the use of their cars during the greater portion of the period when the other members do not need the cars.

My idea would be for all of the freight cars to be put into the pool. In order to obviate the various methods of classification of cars and the necessity for an equipment guide to determine what the car is, the cars should be marked with a specific pool mark.

For illustration: The first initial would indicate the classification such as:

A—automobile or furniture cars;
B—box cars;
C—coke cars;
D—dump cars;
F—flat cars;
G—gondola cars;
H—hopper bottom cars.

The second letter to indicate the length, such as:

A—60 feet long and under;
B—55 feet long and under;
C—50 feet long and under;
D—45 feet long and under;
E—40 feet long and under;
G—36 feet long and under.

The third letter to indicate the capacity, such as:

A—250,000 lb. and under;
B—225,000 lb. and under;
C—200,000 lb. and under;
D—175,000 lb. and under;
E—150,000 lb. and under;
G—125,000 lb. and under;
H—110,000 lb. and under;
J—100,000 lb. and under;
K—80,000 lb. and under.

Therefore, if a box car is 36 feet long and of 80,000 lb. capacity, the first initial or marking on the car would be "B" for box car, the second initial would be "G" for 36 feet long, and the third letter would be "K" for 80,000 lb. capacity. Thus, all *pool* cars of this class would be marked "B-G-K" and allotted their series according to the number of cars owned in such pool.

For illustration: A road having 14,000 cars would be given

* Abstract of written discussion of E. E. Betts' paper presented at the September meeting of the Western Railway Club, as noted in the *Railway Age Gazette* of September 24, page 578.

numbers from 1 to 14,000; a road having 9,000 cars would be given numbers 14,001 to 22,999, etc. Each car should bear ownership plates and, if necessary, to preserve identity, a stencil on the ends of the car, above the ownership plates, showing the original initials and car number. This will simplify reporting of cars, as the moment anybody, whether railroad man, shipper or consignee (after the scheme becomes known) on seeing "B-G-K" would know it was a box car, 36 feet long inside and 80,000 lb. capacity.

All roads should report to the pool the per diem on these cars at the current per diem rate, provided we remain under the present per diem arrangement. However, my idea contemplates an exchange settlement plan, as outlined in my various papers on the subject for the last 25 years. For illustration: On December 31, 1915, road "A" has 26,250 box cars; they are put into the pool. On that date an inventory develops that road "A," including its own cars, has 19,750 cars on its rails belonging to members of the pool; the difference between what it has on its own rails and what it has contributed to the pool represents its debit or credit balance each day, and the debits must agree with the credits.

The scheme also admits of subsequent readjustments of the per diem rate or exchange balance rate on the various classes of cars. Thus: It may be shown that for all "B-G-K" cars the per diem rate or settlement will be 40 cents, or one cent per ton capacity. All cars of 100,000 lb. capacity would be put in under 50 cents per car per day; this being more equitable than the present flat rate of 45 cents per car for a little dinky flat car as against the same rate for a great big 60-ton capacity steel self-clearing coal car, or a nice large 40-ton modern refrigerator car.

VALUATION METHODS ON THE BIG FOUR

The parties of the Interstate Commerce Commission, Division of Valuation, have been at work on the Cleveland, Cincinnati, Chicago & St. Louis since September, 1914, necessitating the organization by the railroad of a considerable force to carry on the work required of the railroad in conjunction with the government inventory.

Four government roadway parties have covered over 1,100 miles of line to date. A government terminal party is at work at Indianapolis, and there are two other terminal parties maintained jointly by the government and the railway. Four government parties are also making an inventory of the Western Union lines, while the railroad has a party on its own telegraph and telephone lines. A bridge party, a signal party and a building party, each consisting of two railroad men and one government man, commenced work in June and are following the roadway parties.

The roadway parties are taking only the field notes, which they send direct to the office of the Southern district of the Division of Valuation, at Chattanooga, which is handling all work on the Big Four, including the lines in Illinois which fall outside the boundaries of the Southern district. The terminal parties are making complete summaries of materials and assembly sheets. They also gather enough data to complete the terminal maps. Field work on all lines west of Indianapolis was completed about August 1.

The railroad is represented on each roadway party by a pilot selected from the staff of the engineering department, giving preference to a man who is well acquainted with the lines to be inventoried. The pilots are assigned to a given district sufficiently in advance of the government schedule to enable them to become thoroughly familiar with the property. The same end is accomplished on the joint bridge and building parties by assigning, in turn, old members of the division bridge and building forces who have had long experience with the bridges and buildings in the particular district to be covered.

The pilots walk over the district in advance of the field parties, taking with them all old maps of the line available. With this information as a guide, sufficient notes are taken to enable the drawing room to make complete new maps. This includes complete data on all physical features, right of way, etc. The right page of the notebook is used for the plotted notes, the left page being used to indicate clearing ballast, shoulder widening, rail, sewers, pipe lines, etc. An effort is made also to interview all persons who can possibly give any information concerning hidden quantities.

The roadway parties are supplied with preliminary prints of the prescribed right of way, track and station maps, profiles and quantities on recent construction, all standard track plans, plans of bridges 12 ft. or less in length, lists of leases and abstracts of contracts concerning industrial tracks not owned entirely by the railroad. The bridge party is supplied with plans of all bridges over 12 ft. long, coaling stations, turntables, scales, water station tubs and supports and pipe lines. The building party is furnished all available plans of the buildings in the district.

Owing to the fact that the maps in the company's possession would not fulfill the specifications for maps and profiles as prescribed by the Interstate Commerce Commission, it has been necessary to make entirely new maps, a task requiring the organization of a considerable drafting force. As a result of the special efforts to push the drafting work, rapid progress has

Status of Maps and Profiles-Valuation.

Week ending...7/10/15.....

Division.	Valuation Section.	Length Miles.	Right of Way & Track Maps. Tot. miles Plotted.	Mi. plotted during week.	Tot. miles Traced.	Mi. traced during week.	Tot. miles Finished.	Mi. finished during week.	Profiles. Tot. miles Plotted.	Mi. plotted during week.	Tot. miles Traced.	Mi. traced during week.	Tot. miles Finished.	Mi. finished during week.
Indpls. Term.	1	18.0	18.0	0	18.0	0	18.0	0						
Indpls. P & E.	2	8.5	8.5	0	8.5	0	8.5	0						
White Water	25	63.0	7.0	7.5	0	0								
Cleveland	35	70.8	68.0	4.0	22.0	4.0								
Indpls-Ohio	41	117.5	103.0	23.0	66.0	20.0	22.0	22.0						
Sandusky	42	128.8	99.5	16.0	99.5	16.0	99.5	16.0						
Michigan	46	168.5	149.5	10.0	137.5	19.5	86.0	40.0						
Cairo-South.	9	130.4	20.0	0	20.0	0			7.6	0	4.8	0		
Grand Total.		2271.4	1526.8	65.5	1389.8	61.5	1020.6	78.0	42.16	0	25.28	0	20.08	0

Total plotted-not inventoried by Government.-Maps 1420.8 mi. Profiles 243.8 mi.
Total traced " " " " -Maps 1285.8 mi. Profiles 204.8 mi.
21 Men on maps. 0 Men on Profiles. 3 Men on finishing.
2 Men on special work.

Table Used to Keep a Check on the Drafting Progress

been made, amounting to an output of from 60 to 80 miles of completed maps per week. In the month of June, 280 miles of maps were platted, 288 miles were traced and 276 miles were checked. An accompanying table shows the means by which the progress on the maps is checked from week to week. On all lines save one the maps were made from old maps on hand, supplemented by information collected by the pilots. In the case of the White Water division, 70 miles long, no map was in existence and a complete resurvey was required.

An important feature of the organization is the separation of the work of the draftsmen or plotters from that of the tracers. Wherever practicable one plotter is assigned to a given valuation section which he carries through to completion, and each plotter is expected to make his own search for the necessary data. This arrangement prevents considerable duplication in searching the records, and enables each plotter to become thoroughly familiar with the particular records with which he is concerned.

In accordance with this arrangement the first work to be done by the plotters is to gather and record the information necessary for the prescribed schedule of right of way and also for the list of industrial tracks on which the company's rights are restricted, as provided in Interstate Commerce Commission order No. 12, dated January 21, 1915. To this end mimeograph blanks are provided on which the information can be recorded conveniently. A form headed "Report on Cost and Value of Right of Way and Real Estate" contains blanks not only for

the items required for the schedule to be put on the map, but is designed also for use in compiling the information required on DV. Forms Nos. 107 and 108 for the schedule of land to be filed with the Interstate Commerce Commission, as required in order No. 7, dated November 21, 1914.

The men obtain the information for right of way from the files of the office of the real estate agent. As they are assigned an entire section, the records are gone through by counties, the data being abstracted as found. In consequence, no special search of the records for a particular parcel of land is required unless it is missing when the complete file has been covered. Data as to sidetrack contracts are taken from the files of the engineering department, and recorded on the blanks provided, from which they are eventually copied on DV. Form 135.

When all the right of way sheets of a given district are finished they are given to a typist, who prepares the schedule summary in the form and order required for the map. This shows the parcel number, grantor, grantee, instrument, date, record index and custodian's number. A heading at the top of the sheet gives the date, sheet number, division and valuation section. Two carbon copies are made, one of which is a backed tissue carbon to permit blue printing the schedule on the working print of the map furnished to the field forces. The identification heading at the top of the schedule appears on those working blue prints but will, of course, be omitted when the schedule is placed on the finished maps.

In plotting, the draftsmen work on as long a roll of the detail paper as the alinement will permit. The conventional sheets are indicated roughly. The tracers make sheets of the standard 54-in. length. A material saving in time was obtained by the use of rubber stamps. Each tracer is given a sheet of detail paper upon which have been stamped to correct scale and proportions all conventional signs, names of counties, township numbers, figures from 0 to 9 for the various sizes of numerals used, the abbreviation N.W.¼, etc. By sliding this sheet under the tracing cloth to the proper position the various figures can be traced accurately and quickly. Recently greater efficiency has been obtained by the use of Ockerson printing devices for the same purpose, by means of which the various items are printed directly on the tracing cloth. A printing press has also been installed for printing the titles. To save time in setting them up, cuts have been purchased, giving the combinations of letters and words most frequently used. Another time-saving device is a power eraser made by attaching flexible dental shafting to the shaft of a very small electric motor operated from the lighting circuit. A common red pencil eraser cut roughly to the shape of a disc serves as the rubber.

The draftsmen are under the immediate direction of two squad foremen who assist the plotters in looking for information, investigate disputed points and check the drawings. They also follow up any searches for missing data which have been referred to the real estate department. The drawings are checked by these men principally for specification requirements, hidden quantities, right of way, etc. The complete check is obtained by the use of the working blue prints by the field forces and by furnishing the real estate department with prints to check for right of way. An independent squad of draftsmen corrects the tracings for errors discovered by the field forces and by the real estate department.

The organization under the direction of the real estate agent is at work preparing the schedule of land according to D. V. Forms 107 and 108. For this purpose they use the "Reports of Costs and Value of Right of Way and Real Estate" prepared by the plotters in the valuation office, checking the information which the plotters have entered and supplying the remaining data. This requires a search of all the records of the railroad. All new real estate records are kept and indexed in the office of the real estate agent, but old records are in the files of the auditor, except such as are filed in the construction correspondence in the chief engineer's office. The work is further complicated by the fact that the Big Four, like most other roads, has absorbed a great many small corporations, each with independent records. In spite of these obstacles, about 500 miles of line had been scheduled by the first of August, all records being carefully indexed as the work was carried along in order that easy reference may be had to the original records.

AN INDEX-RECORD OF STATION AGENTS

R. L. White, superintendent's office, Southern Railway, Memphis, Tenn., sends us the following description of a chronological record and an index of the forces at the stations on his division, which he has found useful in an office where there are a number of clerks who have occasion frequently to correspond with stations or to refer to station business. This record was devised as a remedy for the constant inconvenience felt before anything of the kind was in use. The need of such an aid as this would be felt, of course, not only in a superintendent's office, but in the other departments which have to deal with stations—those of the general passenger agent, the general freight agent, the claim agent, etc.

The scheme requires two books (or two halves of a single book)—one, Book A, in which the names of the persons (employed in the classes to be dealt with) for the whole division are arranged alphabetically, a page for each letter; and the other, B, in which there is a page for each station, with numbered lines, constituting a chronological record for that station.

Take for example the case of a new man employed on the division (A. A. Adams). He is assigned to service at Montague station, which, we will say, is a new station. He is first entered on the Montague page of Book B, which gives the necessary information for Book A (see below). He is then recorded in Book A (the A page), which is an index to Book B. Here the entry is page 1, line 1.

Later on Adams goes to another station, Nomad, and his record at Montague is closed. He then appears on page 2, which is the station agency record for Nomad. After being so entered on Book B, his record on Book A has added to it another item—namely, page 2, line 1.

This same method is followed out in recording the service of Cashier B. B. Bond, first at Montague and then at Nomad; proper record being entered on both agency sheets, and then on page B, of the alphabetical record, which shows service at two different places.

When information is desired as to who is agent or cashier at Montague, it is only necessary to turn to the Montague station page of Book B; when information is desired as to any person, search is made on the page of Book A headed with the initial of his surname.

When the page covering the Montague agency is filled out it can still be known as page 1, the next page being made 1-A.

Sample Pages

X. & Y. R. R.—DIVISION A, BOOK B, PAGE 1

Record of Agency Forces

Montague

	From		To			
Line	Date	Time	Date	Time	Capacity	Name
1	1-1-14	7:00 a. m.	1-1-15	7:00 a. m.	Agent	A. A. Adams
2	1-1-14	7:00 a. m.	1-1-15	7:00 a. m.	Cashier	B. B. Bond
3	1-1-15	7:00 a. m.	*		Agent	C. C. Cox
4	1-1-15	7:00 a. m.	*		Cashier	D. D. Doe

X. & Y. R. R.—DIVISION A, BOOK B, PAGE 2

Record of Agency Forces

Nomad

	From		To			
Line	Date	Time	Date	Time	Capacity	Name
1	1-2-15	7:00 a. m.	7-1-15	7:00 a. m.	Agent	A. A. Adams
2	1-2-15	7:00 a. m.	7-1-15	7:00 a. m.	Cashier	B B. Bond

X. & Y. R. R.—DIVISION A, BOOK A, PAGE A

Record of Agents and Their Forces

A

Name		Page and Line	
Adams	A. A.	1/1	2/1

X. & Y. R. R.—DIVISION A, BOOK A, PAGE D

Record of Agents and Their Forces

D

Name		Page and Line
Doe	D. D.	1/4

* This space when left blank, indicates that the person is still in service at that station in the capacity shown.

General News Department

The Interior Department at Washington reports the completion of a section of the new Government railroad in Alaska, 20 miles long. It is said that this line begins at Anchorage, at the mouth of Ship creek (which flows into Knik Arm) and runs in a northerly direction toward the Matanuska coal field. This would seem to indicate that the branch to this coal field is to be the first section of the road to be finished.

The "post office" or mail room in the general office building of the Baltimore & Ohio at Baltimore is now equipped with lock boxes, in the same style as a government post office; and each office in the building, having a key to the box assigned to it in the mail room, sends for its letters at any time of the day or night, as may be desired. This mail room at Baltimore handles about 35,000 pieces of mail every 24 hours, most of these being, of course, railroad service letters.

R. P. Kyle, safety supervisor of the El Paso & Southwestern, in his second annual report, shows a marked diminution in the number of casualties to employees. Taking the years 1913, 1914 and 1915 in order, the records of employees killed have shown 12, 7, 2; and of injured 493, 455, 406. Only two passengers were injured during the past year and none killed; but in the column headed "trespassers and others" the casualties for the three years named, 1913, 1914, 1915, are killed, 9, 10, 12; injured, 22, 32, 45.

The Wisconsin conservation commission has received from the Chicago, Milwaukee & St. Paul an appeal for protection from the colony of beaver which have taken it upon themselves to construct a number of dams along Bear creek in Oneida county, causing the water to back up and flood the railroad company's right of way in the vicinity of Merrill and Goodnow. As beaver is protected by law, the railroad could not kill or trap the animals, even though their dams are causing washouts.

A westbound express train of the Baltimore & Ohio was stopped by robbers near Central station, W. Va., on the morning of October 8, about 2 o'clock, and a large quantity of registered mail was carried off. Included in the loot were 90 packages of unsigned bank notes, in transit from Washington to banks in western states. The robbers moved the engine and mail car three miles forward from the place where the train was stopped, and there they were taken into an automobile which was waiting in charge of an accomplice.

President Ripley, of the Atchison, Topeka & Santa Fe, on September 5 addressed a telegram to the Mayor of Ardmore, Okla., offering to settle all claims for personal injury and property losses resulting from the explosion of a tank car of gasolene on the company's tracks at Ardmore on September 22. Mr. Ripley made it plain that the railroad was not assuming liability for the accident. The verdict of the coroner's jury was that the accident was caused "through negligence of the Santa Fe Railroad Company and its employees, but said negligence was not felonious."

The Gulf Hurricane

The damage done by the storm of September 29 to the tracks of the Louisville & Nashville proved so serious that both freight and passenger trains are still being detoured by way of the Gulf & Ship Island and the New Orleans & North Eastern, by way of Hattiesburg. The distance from Gulfport to New Orleans by this route is 180 miles, as compared with 67 miles by the L. & N. Two complete passenger trains are run each way daily, and from four to six freight trains. On October 5 the line had been made passable from Mobile as far west as Bay St. Louis.

The damage to the track of the New Orleans & North Eastern was not very extensive, but traffic was suspended from Wednesday, September 29, until Sunday, October 3, mainly because of the loss of telegraph, telephone and block signal wires which hampered the roadway department in assembling men and material for repair work. The water in Lake Pontchartrain did not subside until Friday evening. On the trestle of this road across the lake, six miles long, it was necessary to drive only 17 new piles. It was necessary to use single track between South Point and Citrus, 10 miles, until October 8.

Service over the Illinois Central's main line to New Orleans, on which 18 miles of double-track was washed out between New Orleans and Hammond, was resumed on October 8, when a new single track over this line was completed. While the main line was cut, service was maintained by detouring via the Yazoo & Mississippi Valley from New Orleans to Baton Rouge, and thence to Hammond via the Illinois Central.

Dinner to President Ripley

The officers and directors of the Atchison, Topeka & Santa Fe will give a dinner to President E. P. Ripley at the Blackstone hotel, Chicago, on Saturday evening, October 30, on the occasion of Mr. Ripley's seventieth birthday. The guests will number about 300, and will include intimate friends of Mr. Ripley, men with whom he has been closely associated in business, and the chairmen and presidents of the leading railways of the country.

Decisions of Accounting Officers

The Association of Railway Accounting Officers has in preparation a book containing a synopsis of all decisions and recommendations of the association relating to passenger accounts up to April, 1915. The book will contain the association's standard passenger forms and will be bound in cloth. Each member will receive a copy of the book free.

Extra copies, or copies for non-members, will be furnished at 75 cents each. The secretary of the association is E. R. Woodson, Woodward building, Washington, D. C.

Signalmen Imprisoned

Signalman Tinsley, chiefly responsible for the disastrous collision at Quintinshill (Gretna), Scotland, May 22 last, was tried for manslaughter in court at Edinburgh, September 15, and was sentenced to three years' penal servitude. The night signalman, Mechan, who was just going off duty at the time the error occurred, was sentenced to imprisonment for 18 months. Fireman Hutchinson, who was in the cabin at the time, was tried for manslaughter, but acquitted. The fireman had gone into the cabin in accordance with the rule to see that the signalman made no mistake which should endanger his train, standing near by; and he neglected to correct the signalman's error in not putting a collar on the signal lever as a precaution against improper movement of that lever. This collision was reported in the *Railway Age Gazette* of June 11, and October 8.

Reorganization of Association of Western Railways

A change has been made in the organization of the Association of Western Railways. Heretofore the chairman of the General Managers' Association of Chicago has been also chairman of the Association of Western Railways and chairman of its executive committee. Under the new plan the executive committee of the association will elect at its first meeting of each year a chairman of the committee, who shall also be ex-officio chairman of an advisory committee, appointed by the executive committee and consisting of eight of its members. W. G. Bierd, president of the Chicago & Alton, has been elected chairman of the executive committee and of the advisory committee. The executive committee will select an executive secretary, who may also be chairman of the General Managers' Association of Chicago. As noted elsewhere, J. W. Higgins, general manager of the Missouri Pacific, has been appointed chairman of the General Man-

agers' Association of Chicago and also executive secretary of the Association of Western Railways. Regular meetings of the advisory committee are to be held every two months on fixed dates at Chicago, and special meetings may be called at other times. The executive committee will obtain labor statistics from the different railroads, in addition to making investigations of other matters of interest to the railroads, reporting to the advisory committee, and will maintain a bureau of statistics for the compilation of such statistical and other historical matter as may from time to time be required by the advisory committee.

The New England Railroad Club

At the regular monthly meeting of the New England Railroad Club, to be held at the New American House, Boston, Mass., on Tuesday evening, October 19, an illustrated paper will be presented by F. M. Davison, of the Boston & Albany, entitled "Architecture in Railroad Work."

New York Railroad Club

At the regular monthly meeting of the New York Railroad Club to be held in the Engineering Societies' Building, 29 West 39th street, New York, on Friday evening, October 15, a paper will be presented by W. R. McKeen, consulting engineer, motor cars, of the Union Pacific, on the "Value of Motor Cars to Railroad Systems."

Railroad Men's Improvement Society

At the first meeting for the season the Railroad Men's Improvement Society held at the Meridian Club, 90 West street, New York, on October 7, a paper was presented by George P. Barker, president of the Efficiency Club of New York, entitled "Increasing Efficiency in Business." The paper dealt entirely with human efficiency and aimed to show how a man should try to bring out the elements of success existing in him.

National Safety Council

The Fourth Annual Safety Congress of the National Safety Council is to be held at the Bellevue-Stratford Hotel, Philadelphia, October 19, 20 and 21. This organization, composed of large industrial concerns in all parts of the United States, has now become an important body, its convention last year at Chicago having brought together about 1,500 delegates. It is expected that the meeting this year will draw a still larger number. All branches of industrial and civic life are represented in the different sections. At the general session on Tuesday, the 19th, W. C. Wilson, claims attorney of the Delaware, Lackawanna & Western, will deliver an address on Public Safety and the Railroads.

The meetings of the railroad section are to be held on Wednesday, October 20, from 9 a. m. to 5 p. m., and on Thursday, the 21st, from 9:30 a. m. until noon. The chairman of this section is Marcus A. Dow, general safety agent of the New York Central Lines, New York City. After the opening address by the chairman there will be a discussion of Mr. Wilson's paper (delivered the day before). R. C. Richards, Chicago & North Western, will speak on the value of the National Safety Council to railroads. Other subjects and speakers are as follows: Automobile Accidents, J. C. Rose, chief claim agent, Pennsylvania Railroad; Prizes to Committeemen, by W. C. Wilson, D., L. & W.; How to Maintain Interest in Safety Work, by W. B. Spaulding, claims attorney, St. Louis & San Francisco; How to Reach Non-English Speaking Employees, by Isaiah Hale, Atchison, Topeka & Santa Fe; Moving Pictures and How to Get Good Films, by C. H. Blakemore, Norfolk & Western. C. T. Banks, safety supervisor of the Erie, will also speak.

The papers which are named on the program are not expected to take up the whole of the time, and opportunity will be allowed for full and free discussions. Railroad officers interested in safety work may introduce any relevant topic. All railroads are invited to be represented, without regard to whether they are or are not members of the National Safety Council.

The president of the National Safety Council is R. W. Campbell, of the Illinois Steel Company, and one of the vice-presidents is R. C. Richards, of the Chicago & North Western. The secretary is W. H. Cameron, Chicago.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 26-27, 1915, French Lick Springs Hotel, French Lick Springs, Ind.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 17, 1915, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.

ASSOCIATION OF RAILWAY ELECTRIC ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October 18-24, 1915, Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 14-15, 1915, St. Louis, Mo.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915. Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Colo.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total inc. mis.	Way and structures.	Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
MONTH OF JULY, 1915															
Chicago, Indianapolis & Louisville	622	$365,451	$156,140	$568,140	$60,746	$105,032	$19,612	$193,805	$178	$18,803	$398,301	$169,839	$27,040	$142,739	$3,000
Kansas City, Mexico & Orient	737	160,129	32,479	202,931	55,918	44,465	8,714	91,071	.....	8,948	209,116	—6,186	10,000	—16,186	—73,089
Northwestern Pacific	507	145,858	272,489	462,502	59,507	42,063	6,352	120,796	.....	7,695	234,767	227,735	17,045	210,675	30,778
Oahu Ry. & Land Co.	114	124,252	21,445	155,518	10,152	9,564	682	26,169	.....	3,585	50,152	105,366	7,250	98,116	—991
Ulster & Delaware	129	46,964	68,877	133,848	14,935	13,008	2,654	46,909	53	2,700	80,259	53,589	3,500	50,089	—1,140
MONTH OF AUGUST, 1915.															
Alabama & Vicksburg	143	$76,464	$36,688	$125,171	$17,916	$25,725	$3,642	$43,675	$2,246	$5,260	$98,464	$26,706	$7,936	$18,770	$5,839
Alabama Great Southern	309	272,749	101,111	397,796	34,103	85,984	13,894	126,604	3,182	7,538	269,800	127,996	15,152	112,830	16,430
Ann Arbor	294	124,832	62,282	201,601	25,793	30,383	5,249	72,753	670	79,933	142,781	58,820	12,800	45,793	—21,215
Arizona Eastern	378	195,877	35,095	244,730	34,093	24,820	2,118	50,192	1,016	10,048	122,101	122,629	14,220	108,409	54,477
Atchison, Topeka & Santa Fe	8,620	5,643,909	2,955,853	9,382,839	1,284,789	1,408,300	207,116	2,421,026	.....	166,593	5,460,646	3,922,193	412,065	3,506,962	669,032
Atlanta & West Point	93	46,563	40,042	101,268	13,041	20,939	5,383	31,523	3,021	4,558	78,465	22,804	5,525	16,777	7,783
Atlanta, Birmingham & Atlantic	638	151,300	49,625	219,229	39,888	40,244	12,048	90,932	26	8,912	192,050	27,177	13,100	14,077	—9,411
Atlantic & St. Lawrence	167	66,524	34,620	109,481	25,728	23,460	3,570	50,331	.....	3,238	106,328	3,153	11,505	—8,352	—36,993
Atlantic Coast Line	4,699	1,294,492	563,206	2,017,173	360,209	484,076	55,261	817,252	6,351	66,182	1,788,184	228,989	140,000	88,313	—15,209
Baltimore & Ohio	4,535	7,165,763	1,494,825	9,348,857	1,047,673	1,768,378	163,216	2,748,041	46,356	180,716	5,954,349	3,394,508	276,429	3,116,709	607,434
Baltimore & Ohio Chicago Terminal	79	.....	1,118	134,559	20,250	12,311	976	55,575	2,302	5,003	94,664	39,895	17,654	20,888	—104
Baltimore, Chesapeake & Atlantic	88	79,447	68,492	153,448	13,551	30,557	2,043	62,096	.....	2,632	110,879	42,568	2,249	40,319	—9,242
Bangor & Aroostook	631	163,290	60,650	241,342	47,380	51,177	2,693	70,127	3,319	10,423	185,072	56,270	12,675	43,595	11,887
Bessemer & Lake Erie	205	1,204,697	49,682	1,268,925	81,877	156,984	7,990	241,469	.....	11,693	489,592	779,333	16,794	762,538	76,931
Bingham & Garfield	27	170,925	2,994	174,595	16,371	14,835	1,040	21,826	192	1,848	56,113	118,482	4,014	114,467	51,976
Boston & Maine	2,302	2,340,000	1,603,261	4,305,024	518,075	534,980	32,571	1,663,909	17,984	102,379	2,869,897	1,435,127	164,197	1,270,930	349,322
Buffalo & Susquehanna R. R. Corporation	253	112,159	7,813	121,549	23,355	32,103	1,094	31,087	.....	5,437	93,076	28,473	2,600	25,873	—4,052
Buffalo & Susquehanna Railway	91	16,357	7,195	25,998	3,935	5,560	444	12,053	22	2,335	24,350	1,648	1,600	48	6,384
Buffalo, Rochester & Pittsburgh	586	792,054	115,818	946,542	170,362	199,652	12,334	281,019	1,069	22,433	686,870	259,672	20,000	239,672	—44,248
Canadian Pacific Lines in Maine	233	39,241	19,115	64,467	20,546	13,683	5,006	27,103	.....	3,530	69,869	—5,401	12,000	—17,401	8,967
Carolina, Clinchfield & Ohio	283	201,726	20,787	227,677	22,211	27,805	7,353	38,678	.....	8,689	103,537	124,140	14,250	109,834	30,749
Carolina, Clinchfield & Ohio of S. C.	18	9,821	1,492	11,630	999	70	1,699	2,259	.....	624	5,641	5,990	750	5,240	791
Central of New Jersey	681	1,912,953	716,202	2,793,578	235,715	488,676	32,069	939,379	12,709	47,348	1,755,893	1,037,685	116,928	920,757	—12,407
Central New England	304	302,234	42,334	358,211	56,195	33,995	1,324	88,733	.....	5,163	185,294	172,917	12,800	160,116	84,645
Central Vermont	411	211,375	104,449	341,210	54,697	53,953	10,574	136,340	1,075	6,437	263,076	78,134	15,590	62,543	9,683
Charleston & Western Carolina	341	84,018	29,687	120,169	26,160	18,099	3,155	45,721	.....	4,420	97,555	22,614	5,000	17,614	3,887
Chesapeake & Ohio Lines	2,374	3,152,618	593,514	3,973,598	446,129	815,950	52,394	1,093,345	19,746	71,573	2,497,887	1,475,712	115,120	1,360,592	314,014
Chicago & Eastern Illinois	1,282	947,924	273,929	1,334,129	233,377	332,940	20,825	449,955	7,606	36,781	1,078,978	255,151	53,600	201,264	—159,765
Chicago, Indianapolis & Louisville	622	409,499	173,148	631,045	65,263	109,560	19,017	196,912	56	16,666	406,998	224,047	26,815	197,217	32,484
Chicago & Alton	1,052	889,235	382,456	1,375,058	161,738	298,091	33,344	420,108	9,587	30,804	952,983	422,075	43,121	378,926	—46,157
Chicago & Erie	270	480,423	59,539	585,731	64,966	60,183	17,784	221,281	2,023	12,659	376,074	209,657	20,500	189,157	151,865
Chicago & Northwestern	8,108	4,456,880	2,093,723	7,328,670	1,179,319	1,238,444	113,886	2,448,308	55,408	150,143	5,161,172	2,167,499	385,000	1,779,479	—267,707
Chicago, Burlington & Quincy	9,366	5,210,839	2,160,318	8,147,525	1,240,254	1,195,941	147,354	2,300,471	15,765	158,601	5,118,386	3,029,139	353,399	2,675,740	—506,227
Chicago Great Western	1,427	806,340	309,327	1,221,097	187,594	215,089	44,159	402,413	8,821	32,557	889,790	331,307	46,150	284,511	—88,566
Chicago Junction	13	.....	.....	177,702	22,701	15,788	986	88,407	.....	4,863	132,744	44,958	2,519	42,439	9,999
Chicago, Milwaukee & St. Paul	10,076	5,545,526	1,846,643	8,285,177	920,027	1,297,314	163,203	2,908,139	69,904	156,075	5,320,548	2,964,628	454,924	2,508,400	359,160
Chicago, Peoria & St. Louis	255	105,996	29,055	143,810	25,344	27,830	5,519	55,402	.....	5,299	119,395	24,415	4,800	19,615	—13,631
Chicago, Rock Island & Gulf	477	169,708	57,933	248,720	48,805	37,675	9,035	84,533	2,175	7,552	189,774	58,946	10,592	48,158	—4,505
Chicago, Rock Island & Pacific	7,657	3,834,694	1,828,230	6,137,143	1,026,789	1,095,413	148,161	2,177,787	58,011	139,295	4,643,952	1,493,191	272,186	1,220,902	—334,717
Chicago, St. Paul, Minn. & Omaha	1,753	850,219	491,757	1,465,900	271,089	200,129	30,841	493,785	15,058	36,527	1,045,378	420,522	82,277	337,351	—169,815
Chicago, Terre Haute & S. E.	374	154,970	17,608	177,854	29,381	33,929	3,710	49,749	668	7,753	125,191	52,663	10,417	42,247	—9,785
Cincinnati, Hamilton & Dayton	1,003	731,428	153,563	994,086	146,575	153,313	19,111	357,161	3,818	22,688	702,116	291,970	34,581	257,098	54,791
Cincinnati, New Orleans & Texas Pacific	337	581,451	146,229	779,856	87,289	207,164	24,188	237,445	5,815	18,548	580,390	199,466	31,000	168,440	—9,199
Cincinnati Northern	246	119,302	24,916	149,892	32,632	23,403	2,700	45,324	.....	4,336	108,394	41,498	5,500	35,993	—12,693
Cleveland, Cincinnati, Chic. & St. Louis	2,381	2,410,876	869,336	3,563,590	429,267	638,277	73,429	1,118,871	26,735	70,106	2,339,899	1,223,691	128,000	1,095,445	279,319
Colorado Midland	338	93,573	31,113	137,181	26,727	32,749	8,042	57,240	2,217	5,294	132,270	4,911	10,000	—5,089	—35,719
Colorado & Southern	1,089	480,085	160,678	684,527	117,479	148,257	9,635	191,233	5,313	26,519	498,435	186,092	35,000	151,054	8,567
Cripple Creek & Colorado Springs	87	87,572	44,932	134,773	20,373	15,404	4,853	32,216	.....	3,443	76,289	58,484	5,223	53,261	.....
Cumberland Valley	164	199,571	62,815	276,764	30,869	27,327	3,872	80,283	768	7,606	150,724	126,039	5,794	120,245	32,544
Delaware, Lackawanna & Western	759	2,565,042	817,995	3,758,762	480,889	573,997	71,708	1,129,117	32,100	81,611	2,361,731	1,397,032	186,600	1,210,170	86,935
Denver & Rio Grande	2,577	1,407,013	639,122	2,243,211	362,670	320,584	37,350	568,441	68,127	51,647	1,408,819	834,391	90,000	744,367	243,658
Denver & Salt Lake	255	126,709	52,483	188,849	21,381	24,081	2,689	54,088	.....	5,436	107,676	81,172	8,021	73,151	5,382
Detroit & Toledo Shore Line	81	108,120	.....	109,427	12,425	7,532	1,422	29,659	.....	2,734	53,773	55,654	5,575	50,079	4,486
Detroit & Mackinac	393	52,624	33,555	93,835	11,203	16,973	2,269	33,156	400	2,534	66,535	27,300	7,492	19,807	—5,904
Detroit, Grand Haven & Milwaukee	191	184,000	50,500	267,620	19,122	33,219	5,529	103,128	803	3,791	165,591	102,029	3,770	98,258	56,114
Detroit, Toledo & Ironton	441	134,281	18,334	164,129	23,081	22,953	3,571	62,738	.....	5,886	118,229	45,899	5,500	40,393	—1,985
Duluth & Iron Range	273	875,736	19,731	917,989	60,072	73,411	1,106	163,858	869	8,387	307,702	610,287	47,757	562,530	222,139
Duluth, Missabe & Northern	370	1,465,982	29,340	1,553,656	103,197	123,072	2,752	196,019	5,453	8,733	439,226	1,114,430	80,220	1,034,210	545,344
Duluth, South Shore & Atlantic	626	200,001	91,898	324,871	55,989	36,076	7,351	99,771	4,068	9,128	212,383	112,488	17,000	95,456	37,403
Duluth, Winnipeg & Pacific	185	84,168	16,431	103,772	12,147	11,015	1,645	32,216	99	5,677	62,798	40,979	5,189	35,790	46,294
El Paso & Southwestern Co	1,027	650,185	115,327	813,928	162,402	107,388	17,576	202,068	6,464	24,690	520,560	293,368	34,889	258,476	7,318
Elgin, Joliet & Eastern	777	931,341	21	993,467	89,794	160,572	6,831	236,575	.....	20,423	514,192	479,275	35,075	444,200	110,872
Erie	1,988	3,982,809	927,205	5,360,035	460,900	720,323	91,169	1,687,738	36,438	102,696	3,082,913	2,277,122	168,654	2,079,638	616,802
Florida East Coast	745	207,535	92,039	345,453	65,447	59,993	6,089	146,593	2,583	15,399	294,379	51,074	18,504	32,556	—7,459
Fort Worth & Denver City	454	292,944	151,404	468,172	69,115	86,399	7,065	128,732	3,396	14,982	309,690	158,482	18,748	139,734	1,508

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1915.—(Continued)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total inc. misc.	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Galveston, Harrisburgh & San Antonio	1,351	$648,402	$236,738	$924,395	$128,973	$126,107	$25,254	$330,067	$10,049	$32,228	$651,298	$273,097	$46,269	$226,475	$39,922
Galveston Wharf	13	.....	.....	71,898	12,129	1,945	336	18,423	52,388	372	85,593	—13,695	9,218	—22,913	—41,847
Georgia	307	133,812	69,896	219,188	22,737	40,337	13,205	98,355	95	7,131	181,860	37,328	3,225	34,103	12,144
Georgia, Southern & Florida	395	92,734	51,928	164,950	21,137	30,964	6,466	68,629	.....	8,796	135,992	28,959	10,122	18,677	9,289
Grand Rapids & Indiana	575	249,417	207,264	503,769	58,035	68,130	11,130	179,793	4,060	14,109	335,257	168,512	21,647	146,865	—40,902
Grand Trunk Western	347	500,000	128,000	672,289	53,189	107,764	16,862	223,834	6,289	11,866	419,804	252,485	32,970	219,514	70,547
Great Northern	8,103	4,176,879	1,319,033	6,162,627	705,095	629,700	98,153	1,541,268	76,159	120,367	3,154,688	3,007,939	384,775	2,623,028	—599,973
Gulf, Colorado & Santa Fe	1,938	736,439	285,272	1,091,195	339,627	197,744	30,073	427,795	.....	35,878	1,028,779	62,416	58,203	4,054	—457,754
Gulf & Ship Island	308	108,227	29,395	145,841	12,410	24,674	3,040	34,506	224	6,192	81,047	64,794	7,740	56,972	7,746
Hocking Valley	351	506,980	81.833	650,074	60,520	88,127	8,470	165,767	.....	14,076	336,960	313,114	37,400	275,714	27,105
Houston, East & West Texas	191	62,040	29,113	98,152	24,514	19,068	1,894	34,748	696	2,960	83,821	14,331	5,779	8,500	— 20,646
Houston & Texas Central	895	317,499	136,676	494,797	72,816	84,294	15,050	180,591	6,055	18,803	377,040	117,757	29,883	87,572	—26,409
Illinois Central	4,767	3,842,224	1,208,655	5,529,843	875,132	1,286,369	96,236	1,723,226	29,714	138,674	4,135,598	1,394,246	269,700	1,123,560	—136,704
Indiana Harbor Belt	110	.....	.....	270,085	35,410	29,590	2,510	95,480	.....	7,808	170,798	99,287	7,502	91,769	6,120
International & Great Northern	1,160	401,310	145,330	598,049	109,262	147,434	21,121	286,346	2,351	29,078	592,678	5,371	28,795	—23,492	—80,044
Kanawha & Michigan	177	251,221	33,242	290,761	39,057	60,308	3,165	72,673	19	7,145	182,367	108,393	12,300	96,093	—11,668
Kansas City Southern	837	593,607	134,561	807,407	82,505	81,369	26,837	262,720	.....	34,418	475,403	332,004	43,764	287,743	19,037
Lake Erie & Western	900	467,952	82,134	575,173	68,760	115,609	12,879	196,902	.....	12,063	406,213	168,960	24,000	144,955	—30,631
Lehigh & Hudson River	97	143,040	11,510	161,397	20,922	22,797	1,788	50,546	.....	3,454	99,507	61,890	4,200	57,690	5,471
Lehigh & New England	296	252,650	1,813	270,009	39,498	31,574	1,647	62,842	.....	5,211	140,773	129,237	6,200	123,037	25,937
Lehigh Valley	1,442	3,093,546	462,366	3,779,598	435,198	717,388	89,053	1,227,940	13,687	684,449	2,549,941	1,229,657	139,000	1,090,477	—52,436
Long Island	398	298,134	995,875	1,472,453	118,508	130,676	13,252	481,661	6,141	24,750	774,988	697,465	77,645	618,164	—31,352
Louisiana Western	208	100,814	56,043	169,932	33,342	36,431	6,232	51,681	2,017	6,232	135,923	34,009	9,975	23,986	—19,845
Louisiana & Arkansas	279	108,780	15,176	127,908	26,577	24,212	3,017	33,436	.....	3,995	91,236	36,672	7,500	29,172	—37,624
Louisiana Ry. & Navigation Co	351	143,451	29,984	182,751	29,267	28,010	6,418	60,772	.....	4,992	129,459	53,292	9,498	43,790	2,220
Louisville & Nashville	5,037	3,302,107	1,015,006	4,628,371	713,601	827,953	103,938	1,341,488	26,174	97,171	3,106,433	1,521,938	189,522	1,321,329	330,614
Louisville, Henderson & St. Louis	200	74,862	45,042	126,720	37,734	16,095	5,574	35,645	.....	2,876	97,924	28,796	3,800	24,959	—12,621
Maine Central	1,220	553,163	405,135	1,050,517	142,104	125,411	12,123	347,615	7,761	26,297	661,054	389,463	53,084	336,379	23,501
Michigan Central	1,785	1,919,013	974,841	3,243,727	419,530	461,011	58,349	1,056,937	49,889	57,611	2,103,326	1,140,401	121,000	1,019,278	134,874
Midland Valley	380	105,249	33,089	145,706	25,326	16,895	2,303	41,849	.....	5,525	91,898	53,808	5,359	48,434	34,170
Minneapolis & St. Louis	1,646	592,043	180,974	822,665	114,079	122,369	16,727	298,923	119	21,580	573,797	248,868	31,243	217,279	—60,244
Minn., St. Paul & Sault Ste. Marie	4,190	1,664,156	838,649	2,539,032	314,170	343,069	48,230	753,235	20,497	57,189	1,534,393	1,004,639	117,729	886,910	193,798
Missouri, Oklahoma & Gulf Ry. Co. of Texas	19	7,777	401	8,281	1,171	1,404	845	4,346	.....	422	8,188	93	140	—46	—3,725
Missouri & North Arkansas	365	66,236	32.672	105.590	27,937	21,274	2,306	34,446	.....	6,675	91,638	13,952	5,800	8,081	16,916
Missouri, Kansas & Texas System	3,865	1,724,315	745,709	2,653,342	414,493	394,177	53,655	884,654	17,658	81,065	1,835,346	817,995	140,567	676,630	—15,119
Missouri, Oklahoma & Gulf	334	70,702	19,945	95,149	29,364	18,043	4,436	43,893	71	7,243	103,050	—7,902	5,131	—13,054	—37,019
Mobile & Ohio	1,122	737,502	109,487	897,078	103,759	209,751	35,577	332,310	2,404	28,526	712,327	184,751	32,636	152,029	—31,971
Monongahela	75	126,632	2,282	131,022	16,029	15,275	1,216	26,016	.....	3,191	61,728	69,294	2,500	66,794	.....
Morgan's La. & Texas R. R. & S. S. Co.	405	195,050	84,031	304,144	56,784	62,287	10,442	127,068	2,520	11,914	270,715	33,429	20,881	12,420	—57,020
Nashville, Chattanooga & St. Louis	1,231	628,154	242,731	945,760	101,922	180,836	46,157	342,984	9,410	31,664	712,858	232,901	26,000	206,619	74,161
Nevada Northern	165	129,976	11,201	145,509	20,501	11,749	789	27,038	64	3,989	64,129	81,379	8,631	72,749	39,458
New Orleans & North Eastern... Frt.	196	212,872	47,986	287,017	32,942	59,439	10,092	88,088	5,585	11,514	207,660	79,357	15,201	64,156	13,416
New Orleans & North Eastern... Pass.	204														
New Orleans, Mobile & Chicago	403	112,490	24,043	143,208	20,942	23,849	4,414	47,133	19	6,680	102,999	40,209	6,883	33,124	—7,284
New Orleans Great Northern... Pass.	283	108,587	27,075	148,720	17,064	23,221	2,677	41,176	178	6,185	90,501	58,219	3,922	54,292	7,309
New Orleans Great Northern... Frt.	277														
New Orleans, Texas & Mexico	286	84,709	20,822	114,670	16,852	21,843	3,728	36,963	.....	8,321	87,707	26,963	1,502	25,409	—5,885
New York Central Railroad	5,979	9,134,055	4,609,059	15,983,789	1,834,575	2,700,240	260,364	4,600,986	238,372	334,826	9,969,363	6,014,425	774,989	5,236,446	.....
New York, Chicago & St. Louis	569	862,917	149,367	1,053,086	111,639	143,030	51,624	407,807	5,423	22,022	741,545	311,541	42,000	269,431	61,770
New York, New Haven & Hartford	2,005	3,005,710	2,649,889	6,264,053	645,716	1,058,224	39,385	1,992,101	53,284	129,232	3,914,469	2,349,584	254,500	2,095,040	462,800
New York, Ontario & Western	568	440,402	336,373	912,030	128,824	113,595	81,550	276,997	.....	16,082	543,652	368,378	20,983	347,379	—14,277
New York, Philadelphia & Norfolk	112	305,407	46,728	381,230	38,599	80,676	5,465	137,709	3,731	11,092	277,272	103,959	9,500	94,415	18,447
New York, Susquehanna & Western	140	177,677	50,409	252,392	23,146	29,840	2,001	107,123	.....	5,379	167,397	84,996	13,208	71,774	5,134
Norfolk & Western	2.042	4,071.610	513,742	4,729,492	664,215	822,787	53,523	1,151,360	8,654	68,323	2,747,719	1,981,773	168,000	1,812,180	505,690
Norfolk Southern	908	215,120	106,890	345,465	45,974	49,665	8,143	118,928	65	16,057	238,832	106,633	12,251	94,382	31,517
Northwestern Pacific	507	171,644	243,186	456,831	62,564	42,614	6,556	125,428	.....	6,911	242,500	214,331	17,045	197,258	42,298
Northern Pacific	6,471	4,058,933	1,429,033	6,076,329	902,513	602,571	108,793	1,590,116	97,977	89,436	3,306,165	2,770,165	362,770	2,407,327	635,565
Oahu Ry. & Land Co	114	157,355	21,171	186,188	10,181	10,599	695	29,825	.....	3,568	54,868	131,320	7,250	124,070	3,720
Oregon Short Line	2,257	1,308,083	537,397	2,012,249	290,483	211,611	36,526	427,201	37,239	51,170	1,053,853	958,396	114,262	842,899	27,239
Oregon-Wash. Railroad & Nav. Co.	2,027	917,523	487,044	1,525,873	164,877	151,203	46,723	416,676	13,255	56,954	845,239	680,634	92,857	587,681	45,886
Panhandle & Santa Fe	670	288,607	96,318	403,682	117,621	73,268	3,989	98,150	.....	9,716	302,593	101,090	11,108	89,981	2,218
Pennsylvania Company	1,757	4,268,432	1,034,210	5,779,671	755,998	880,219	73,098	1,699,760	31,653	112,084	3,552,812	2,226,859	249,512	1,977,120	369,705
Pennsylvania Railroad	4,528	12,366,968	3,831,455	17,674,765	2,223,743	3,035,262	187,932	5,594,870	242,810	425,234	11,709,850	5,964,916	627,104	5,335,641	735,186
Pere Marquette	2,262	995,391	474.513	1,629.418	187,707	283,864	32,509	542,532	5,160	41,750	1,095,287	534,132	45,538	488.593	31,281
Philadelphia, Baltimore & Washington	717	1,021,435	731,705	1,920,926	255,613	348,277	26,606	716,132	25	48,560	1,395,213	525,713	54,977	470,702	90,479
Pittsburgh & Lake Erie	225	1,561,824	166,702	1,823,879	119,915	239,800	16,313	347,804	3,734	27,862	755,428	1,068,471	49,500	1,018,970	463,877
Pittsburgh, Cincinnati, Chic. & St. L.	1,479	2,589,247	799,280	3,747,745	523,160	627,261	66,716	1,185,634	26,828	75,068	2,504,667	1,243,078	158,568	1,084,142	127,598
Pittsburgh, Shawmut & Northern	294	140,909	10,722	155,236	32,460	38,410	1,421	45,013	.....	3,959	121,263	33,973	1,845	32,128	38,655
Richmond, Fredericksburg & Potomac	88	110,880	72,886	211,727	15,626	30,170	3,895	77,290	2,671	6,863	136,516	75,211	7,586	67,621	11,748

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF FISCAL YEAR ENDING JUNE 30, 1916 — (Continued)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total inc. misc.	Way and structures.	Equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
Alabama & Vicksburg	143	$152,463	$71,448	$246,824	$35,274	$56,540	$7,328	$97,214	$4,314	$10,677	$201,346	$45,477	$15,686	$29,791	$8,870
Alabama Great Southern	309	547,934	201,360	799,943	70,746	178,754	26,828	250,842	6,614	15,937	548,216	251,727	30,305	221,408	39,594
Ann Arbor	294	248,153	117,125	393,758	47,080	61,653	9,645	145,834	1,215	16,245	281,673	112,085	25,600	86,356	—28,220
Arizona Eastern	378	399,928	71,982	499,410	66,097	49,838	4,619	101,520	1,936	21,582	245,374	254,037	28,440	225,584	76,413
Atchison, Topeka & Santa Fe	8,620	10,701,296	5,915,658	18,179,204	2,535,181	2,794,638	406,816	4,815,121	.....	332,281	10,844,810	7,334,395	823,710	6,504.081	1,268.284
Atlanta & West Point	93	91,039	79,054	198,053	26,844	43,640	11,112	61,853	5,571	9,003	158,024	40,029	11,050	28,431	9,620
Atlanta, Birmingham & Atlantic	638	317,923	94,642	450,081	75,562	80,244	25,171	186,774	50	18,373	386,174	63,907	26,200	37,703	—22,414
Atlantic & St. Lawrence	167	134,675	63,800	217,740	47,280	39,397	7,569	102,601	.....	6,890	203,737	14,003	23,010	—9,007	—37,901
Atlantic Coast Line	4,699	2,736,179	1,125,363	4,194,560	740,643	926,098	107,007	1,664,205	12,738	139,192	3,588,018	606,542	280,000	322,831	—94,541
Baltimore & Ohio	4,535	13,890,323	2,801,833	18,019,610	1,884,224	3,419,214	327,974	5,438,361	89,736	388,957	11,548,190	6,471,420	563,835	5,902,247	1,392.222
Baltimore & Ohio Chicago Terminal	79	.....	1,752	262,765	39,043	31,656	1,881	107,815	4,544	10,699	189,217	73,548	35,307	36,874	—5,136
Baltimore, Chesapeake & Atlantic	88	169,461	126,396	307,208	24,821	59,387	4,246	134,594	.....	5,548	228,597	78,611	4,498	74,113	—16,773
Bangor & Aroostook	631	318,807	113,049	467,637	95,538	99,755	5,474	142,491	6,568	21,197	370,976	96,661	25,350	71,311	—721
Bessemer & Lake Erie	205	2,419,408	86,513	2,534,732	154,253	322,652	17,296	475,301	.....	24,222	975,245	1,559,488	33,577	1,525,900	259,766
Bingham & Garfield	27	341,106	5,971	348,138	35,894	35,412	2,017	43,421	399	3,637	120,781	227,357	7,916	221,441	67,031
Boston & Maine	2,302	4,609,368	3,064,678	8,404,260	1,033,719	1,051,325	82,880	3,327,643	36,072	194,275	5,725,914	2,678,346	326,983	2,351,363	758,680
Buffalo & Susquehanna R. R. Corporation	253	218,643	15,002	237,615	45,588	65,104	2,141	63,721	.....	11,222	187,775	49,840	5,200	44,640	7,637
Buffalo & Susquehanna Railway	91	33,291	13,935	52,297	7,827	10,566	903	23,325	65	4,719	47,405	4,892	3,200	1,692	14,894
Buffalo, Rochester & Pittsburgh	586	1,612,000	220,858	1,907,939	354,629	398,224	23,595	548,913	2,132	43,715	1,371,207	536,732	40,000	496,731	—16,663
Canadian Pacific Lines in Maine	233	78,642	35,539	126,733	38,955	27,475	10,593	54,394	.....	6,754	138,172	—11,438	24,000	—35,438	19,502
Carolina, Clinchfield & Ohio	283	368,207	41,510	419,031	41,460	52,435	15,830	71,065	.....	17,043	195,763	223,269	28,500	194,712	30,277
Carolina, Clinchfield & Ohio of S. C.	18	17,317	2,629	20,564	2,614	159	3,332	4,385	.....	1,034	11,512	9,051	1,500	7,551	—1,961
Central of New Jersey	681	3,671,529	1,413,559	5,393,128	481,017	1,002,895	69,915	1,819,349	29,608	114,797	3,517,578	1,875,550	234,079	1,641,471	—91,547
Central New England	304	608,738	85,764	722,352	108,876	61,792	2,377	186,561	.....	9,397	368,837	353,515	25,600	327,913	205,067
Central Vermont	411	417,499	193,305	661,812	99,295	106,336	18,847	270,029	2,141	13,479	510,127	151,685	31,180	120,504	20,534
Charleston & Western Carolina	341	166,737	57,103	236,762	53,856	39,813	6,909	90,245	.....	9,301	200,124	36,637	10,000	26,637	1,303
Chesapeake & Ohio Lines	2,374	6,021,571	1,139,695	7,616,175	861,987	1,586,221	104,438	2,148,249	38,619	145,993	4,882,861	2,733,315	230,240	2,502,696	631,021
Chicago & Alton	1,052	1,619,960	740,257	2,563,416	327,422	583,494	67,346	835,393	18,885	60,987	1,891,857	671,560	86,154	584,991	—134,812
Chicago & Eastern Illinois	1,282	1,783,382	532,526	2,525,724	462,070	624,150	43,083	870,084	14,865	78,541	2,088,082	437,642	107,200	330,015	—396,166
Chicago, Indianapolis & Louisville	622	774,949	329,310	1,199,185	126,008	214,593	38,629	390,717	234	35,469	805,299	393,886	53,855	339,956	35,574
Chicago & Erie	270	915,476	115,412	1,124,389	146,040	108,365	34,021	435,212	4,152	27,307	751,269	373,120	41,000	332,120	351,805
Chicago & Northwestern	8,108	8,696,840	4,116,500	14,387,827	2,438,868	2,451,023	232,988	4,845,357	113,965	303,546	10,347,187	4,040,640	770,000	3,266,301	—643,674
Chicago, Burlington & Quincy	9,366	9,767,873	4,205,954	15,521,649	2,267,600	2,557,447	289,713	4,584,068	152,244	327,751	10,178,823	5,342,826	706,815	4,636,011	—965,140
Chicago Great Western	1,427	1,532,834	605,397	2,349,895	379,560	429,350	91,513	793,698	17,274	67,479	1,776,841	573,054	93,300	478,625	—58,729
Chicago Junction	13	.....	.....	346,201	46,533	33,237	2,017	174,959	.....	12,293	269,039	77,162	4,214	72,940	12,514
Chicago, Milwaukee & St. Paul	10,076	11,076,417	3,651,173	16,504,458	1,882,653	2,472,147	319,847	5,639,025	138,890	321,890	10,280,870	6,223,588	902,156	5,318,939	787,848
Chicago, Peoria & St. Louis	255	197,905	56,604	271,224	54,988	56,494	11,225	106,814	.....	10,970	240,491	30,733	8,898	21,835	—29,981
Chicago, Rock Island & Gulf	477	323,800	113,389	477,280	91,465	72,354	18,494	181,807	4,324	15,225	383,577	93,704	21,184	72,305	—20,347
Chicago, Rock Island & Pacific	7,657	7,133,049	3,548,739	11,575,068	1,964,415	2,201,142	299,453	4,314,588	117,713	283,016	9,178,822	2,396,246	540,463	1,855,070	—670,935
Chicago, St. Paul, Minn. & Omaha	1,753	1,628,906	978,718	2,856,634	508,190	382,018	60,478	980,738	33,548	74,269	2,035,025	821,609	160,232	660,367	—274,029
Chicago, Terre Haute & S. E.	374	298,596	32,794	341,124	62,781	67,031	7,179	98,267	1,402	16,097	252,756	88,369	20,833	67,535	—31,358
Cincinnati, Hamilton & Dayton	1,003	1,409,434	300,364	1,914,837	281,724	292,963	38,625	708,083	6,869	42,422	1,369,576	545,262	67,751	476,695	86,159
Cincinnati, New Orleans & Texas Pacific	337	1,666,711	282,075	1,546,632	174,191	359,153	46,564	473,299	10,371	36.564	1,100,083	446,549	62,000	384,523	16,862
Cincinnati Northern	246	230,446	46,693	288,910	63,583	47,194	5,226	88,527	.....	8,262	212,792	76,118	11,000	65,087	—14,765
Cleveland, Cincinnati, Chic. & St. Louis	2,381	4,489,721	1,670,854	6,727,048	851,053	1,251,352	145,207	2,206,687	51,659	140,434	4,624,973	2,102,075	256,000	1,845,471	298,892
Colorado Midland	338	179,992	58,282	259,098	58,793	63,810	16,169	109,365	4,161	10,610	262,908	—3,809	20,000	—23,809	—22,726
Colorado Southern	1,089	903,717	310,277	1,302,673	215,853	299,014	20,787	372,517	10,401	51,021	969,593	333,080	70,000	263,016	64,509
Cripple Creek & Colorado Springs	87	186,439	87,313	277,905	41,569	29,241	11,247	64,171	.....	7,440	153,667	124,238	12,228	112,010	.....
Cumberland Valley	164	378,581	115,861	521,351	64,789	60,885	8,562	157,264	1,555	15,205	308,260	713,091	11,589	201,502	50,246
Delaware, Lackawanna & Western	959	4,751,584	1,632,560	7,145,834	978,845	1,111,160	146,490	2,211,092	65,720	156,048	4,654,617	2,491,216	373.200	2,117,726	—124,689
Denver & Rio Grande	2,577	2,684,863	1,176,094	4,245,611	746,440	645,813	76,656	1,089,580	135,009	98,588	2,792,086	1,453,525	180,000	1,273,449	336,076
Denver & Salt Lake	255	229,930	100,269	348,019	42,102	50,377	5,589	100,600	.....	11,374	209,931	138,088	16,041	122,046	11,405
Detroit & Mackinac	393	107,226	64,831	187,179	21,054	33,281	4,277	65,288	735	5,148	129,783	57,396	15,043	42,353	—7,651
Detroit, Grand Haven & Milwaukee	191	348,000	105,500	516,740	37,280	58,142	11,609	208,248	1,637	8,516	325,432	191,308	7,540	183,959	121,152
Detroit, Toledo & Ironton	441	243,444	32,509	297,231	39,278	44,172	7,370	123,247	.....	11,778	225,844	71,388	11,000	60,382	1,299
Detroit & Toledo Shore Line	81	213,649	.....	215,324	26,679	15,003	2,976	60,338	.....	5,308	110,303	105,021	11,150	93,871	17,528
Duluth & Iron Range	273	1,694,241	38,173	1,780,388	125,856	153,927	2,411	317,941	1,866	17,239	619,241	1,161,148	92,538	1,068,609	303,031
Duluth, Missabe & Northern	370	2,864,462	56,096	2,998,735	204,608	237,585	4,701	376,000	9,590	17,872	850,355	2,148,380	162,471	1,985,909	1,012,844
Duluth, South Shore & Atlantic	626	386,833	183,533	633,354	119,703	69,448	14,684	196,598	7,947	17,610	425,988	207,366	34,000	173,321	72,814
Duluth, Winnipeg & Pacific	185	183,849	32,544	223,079	24,595	23,769	3,305	67,367	202	11,884	131,122	91,956	11,086	80,870	80,957
El Paso & Southwestern Co.	1,027	1,226,319	240,874	1,562,771	284,378	205,098	36,235	393,872	12,339	51,675	983,570	579,201	69,779	509,420	2,958
Elgin, Joliet & Eastern	777	1,757,896	36	1,875,934	179,417	305,060	13,017	470,443	.....	39,216	1,007,150	868,734	70,150	798,634	190,613
Erie	1,988	7,725,647	1,851,407	10,494,505	932,268	1,537,689	176,946	3,337,215	70,068	206,464	6,232,670	4,261,835	337,308	3,895,416	1,117,671
Fort Worth & Dewer City	454	539,679	279.887	867,790	136,633	168,437	14,694	259,374	6,437	30,235	615,841	251,949	31,401	220,549	—17,433
Florida East Coast	745	415.109	188,914	708,240	130,935	113,764	11,727	293,965	5,160	35,187	586,908	121,332	37,018	84,260	38,151
Galveston, Harrisburg & San Antonio	1,351	1,240,894	480,452	1,798,354	241,347	257,061	56,160	675,814	21,753	63,759	1,314,136	484,218	92,539	390,949	62,732
Galveston Wharf	13	.....	.....	184,632	17,215	5,283	918	50,761	80,593	783	155,551	29,081	18,436	10,645	—35,012
Georgia	307	259,011	133,239	424,965	47,210	76,439	25,512	181,884	193	14,497	345,735	79,230	6,450	72,763	6,950
Georgia, Southern & Florida	395	200,369	105,310	351,448	43,182	63,869	13,455	140,151	.....	18,657	279,315	72,134	20,243	51,488	6,128
Grand Rapids & Indiana	575	489,310	381,832	958,726	112,411	127,819	23,498	362,319	7,939	28,436	662,422	296,304	43,294	252,824	306,277

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF FISCAL YEAR ENDING JUNE 30, 1916—Continued

Name of Road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total inc. mis.	Operating expenses: Maintenance of Way and Structures.	Maintenance of Equipment	Traffic.	Transportation.	Miscellaneous.	General.	Total.	Net from railway operation.	Railway tax accruals	Operating income (or loss).	Increase (or decr.) comp. with last year.
Grand Trunk Western	347	$952,000	$272,000	$1,308,240	$118,010	$218,558	$35,414	$445,358	$12,316	$25,462	$856,117	$453,123	$65,940	$387,180	$184,719
Great Northern	8,102	8,045,196	2,646,929	12,020,751	1,466,604	1,202,136	205,714	3,050,479	160,782	23,659	6,277,457	5,743,294	753,535	4,989,141	—1,129,888
Gulf, Colorado & Santa Fe	1,938	1,620,448	580,603	2,342,719	568,521	394,125	58,279	865,645	.....	68,400	1,949,766	392,953	116,406	275,730	—588,659
Gulf & Ship Island	308	207,206	60,769	285,863	28,183	51,110	5,662	72,316	501	12,656	170,429	115,435	15,336	99,969	8,410
Hocking Valley	351	928,279	156,408	193,210	110,565	170,961	16,776	325,845	.....	30,885	655,031	538,179	74,800	463,379	145,084
Houston, East & West Texas	191	141,180	58,306	213,574	52,803	39,789	4,129	70,033	1,317	6,197	174,116	39,458	11,615	27,872	—35,077
Houston & Texas Central	895	698,803	273,738	1,053,664	156,478	182,237	31,683	369,097	11,463	39,085	789,121	264,542	58,894	205,185	—21,025
Illinois Central	4,767	7,188,999	2,353,016	10,408,669	1,759,804	2,550,225	202,050	3,382,330	59,303	286,647	8,212,483	2,196,186	539,400	1,654,857	—311,748
Indiana Harbor Belt	110	.....	.....	521,616	73,141	52,572	5,857	193,608	.....	15,391	340,568	181,048	15,049	165,915	18,190
International & Great Northern	1,160	859,268	292,240	1,257,748	224,316	288,605	41,702	588,807	7,917	57,279	1,199,219	58,529	58,795	—396	21,659
Kanawha & Michigan	177	491,104	64,037	568,306	76,698	115,233	6,632	143,811	19	14,981	357,374	210,932	24,050	186,882	—10,289
Kansas City Southern	837	1,220,187	262,068	1,638,763	163,926	156,874	51,501	530,211	.....	69,228	941,415	697,348	88,345	608,321	8,587
Lake Erie & Western	900	861,084	151,935	1,064,552	137,577	226,416	25,847	367,420	.....	24,352	781,612	282,940	48,000	234,608	—67,829
Lehigh & Hudson River	97	280,233	21,835	315,492	45,426	42,671	3,207	100,293	.....	7,678	199,274	116,218	8,400	107,818	16,956
Lehigh & New England	296	557,344	2,999	590,011	81,732	65,282	3,398	126,406	.....	10,068	286,886	303,125	12,400	290,725	93,072
Lehigh Valley	1,442	6,137,366	904,754	7,513,360	846,859	1,504,039	173,689	2,425,802	25,980	143,055	5,116,360	2,396,999	277,000	2,119,021	58,020
Long Island	398	598,279	2,059,984	3,025,806	253,764	263,555	31,856	961,119	12,655	59,707	1,582,655	1,443,150	155,290	1,285,579	—23,575
Louisiana & Arkansas	279	223,272	29,719	260,926	53,662	48,511	6,048	66,968	.....	8,206	183,395	77,531	15,000	62,524	—49,116
Louisiana Ry & Navigation Co.	351	274,516	59,176	351,990	59,884	63,494	12,044	118,147	.....	9,928	253,497	98,493	19,000	79,488	1,014
Louisiana Western	208	205,587	109,914	341,497	54,512	69,683	13,267	99,377	4,116	12,518	253,461	88,036	20,000	67,920	—19,466
Louisville & Nashville	5,037	6,504,960	1,979,519	9,114,214	1,418,435	1,650,429	216,004	2,683,978	$56,124	162,055	3,747,932	1,422,615	273,018	1,148,112	—173,283
Louisville, Henderson & St. Louis	200	146,589	77,659	237,748	76,973	31,841	10,691	72,754	.....	5,715	197,973	39,775	7,600	32,124	—34,098
Maine Central	1,220	1,103,202	772,559	2,047,481	297,727	253,226	29,717	705,769	17,786	55,332	1,359,114	688,367	106,181	582,185	25,853
Michigan Central	1,785	3,624,332	1,965,402	6,293,270	802,362	925,080	117,118	2,092,802	94,452	114,025	4,145,838	2,147,431	242,000	1,905,181	349,321
Midland Valley	380	191,830	64,911	270,973	51,404	33,812	4,373	81,010	.....	11,418	182,017	88,957	10,718	78,019	57,185
Minn., St. Paul & Sault Ste. Marie	4,190	3,212,689	1,252,853	4,927,221	632,017	651,866	100,098	1,466,926	42,629	122,388	3,011,432	1,915,789	223,725	1,692,063	217,373
Minneapolis & St. Louis	1,646	1,155,198	356,605	1,615,339	215,486	237,351	35,301	578,886	209	42,110	1,109,343	505,996	62,433	443,207	34,852
Missouri & North Arkansas	365	122,457	62,554	198,176	52,382	41,321	4,300	67,393	.....	10,602	176,000	22,177	11,600	10,504	19,700
Missouri, Oklahoma & Gulf Ry. of Texas	19	16,119	771	17,186	2,882	3,307	1,680	8,827	.....	1,062	17,757	—571	280	—851	—4,535
Missouri, Kansas & Texas System	3,865	3,372,168	1,438,571	5,170,547	844,401	796,390	111,881	1,815,663	34,046	162,055	3,747,932	1,422,615	273,018	1,148,112	—173,283
Missouri, Oklahoma & Gulf	334	135,994	38,626	181,913	63,311	36,577	8,611	84,781	181	14,475	207,936	—26,023	10,259	—36,319	—64,065
Mobile & Ohio	1,122	1,479,741	213,821	1,793,433	202,604	399,336	70,207	667,446	4,469	59,365	1,403,428	390,005	65,272	324,459	—87,042
Monongahela	75	247,096	4,588	255,832	34,703	18,520	1,734	49,224	.....	6,244	110,425	145,407	5,000	140,407	.....
Morgan's La. & Texas R. R. & S. S. Co.	405	390,247	154,208	610,583	108,312	115,539	22,166	251,019	5,113	23,842	525,159	85,424	41,761	43,346	—74,637
Nashville, Chattanooga & St. Louis	1,231	1,251,988	479,019	1,888,063	214,785	359,453	91,882	680,782	18,473	64,477	1,429,689	458,375	52,000	405,984	66,853
Nevada Northern	165	263,891	22,105	294,256	39,562	23,245	1,416	53,711	129	8,153	126,217	168,040	17,536	150,503	59,511
New Orleans & North Eastern	Freight... 196 / Passenger 204	4,125,045	95,769	573,352	58,967	114,661	20,516	177,903	11,204	23,289	406,541	166,811	30,051	136,760	11,007
New Orleans, Mobile & Chicago	403	220,398	48,235	282,805	45,306	45,050	8,626	94,019	—19	14,189	207,171	75,634	13,282	62,105	—26,403
New Orleans, Texas & Mexico	286	188,965	50,001	255,707	41,565	43,727	8,017	81,544	.....	18,798	193,650	62,057	3,003	59,001	—3,252
New Orleans Great Northern	Freight... 277 / Passenger 283	209,633	54,867	289,690	34,152	46,436	5,523	82,300	341	12,131	180,883	108,806	7,814	100,961	—5,633
New York, Chicago & St. Louis	569	1,636,526	300,823	2,017,875	221,319	289,527	101,229	803,634	11,250	42,907	1,469,868	548,007	84,000	463,881	57,755
New York Central Railroad	5,979	17,848,484	9,049,646	31,381,558	3,616,082	5,227,859	503,178	9,207,801	456,476	720,978	19,732,374	11,649,184	1,548,600	10,095,962	.....
New York, New Haven & Hartford	2,005	5,973,655	5,296,314	12,511,713	1,499,168	1,769,182	76,381	4,033,190	101,167	260,229	7,732,802	4,778,911	509,000	4,269,800	1,075,935
New York, Ontario & Western	568	943,735	659,902	1,873,602	247,185	238,403	16,157	568,854	.....	31,375	1,101,974	771,628	41,967	729,634	6,118
New York, Philadelphia & Norfolk	112	712,057	91,155	862,694	80,600	163,260	10,698	300,806	8,223	22,001	585,588	277,106	19,000	258,063	28,871
New York, Susquehanna & Western	140	355,424	102,002	514,267	39,725	56,791	3,692	209,350	.....	11,839	321,296	192,971	26,417	166,541	49,425
Norfolk & Western	2,042	7,910,283	1,004,272	9,196,836	1,284,094	1,603,032	105,705	2,249,412	16,812	136,527	5,359,040	3,837,796	336,000	3,500,006	1,099,203
Norfolk Southern	908	412,362	211,964	677,910	90,413	95,906	15,873	238,298	129	33,359	473,978	203,932	24,602	179,330	40,606
Northern Pacific	6,471	7,386,558	2,872,768	11,426,113	1,876,520	1,387,116	220,226	3,152,340	207,494	176,397	6,860,599	4,565,514	739,918	3,825,149	407,640
Northwestern Pacific	507	317,502	515,675	919,333	122,071	84,677	12,908	246,224	.....	14,606	477,267	442,066	34,090	407,933	73,076
Oahu Railway & Land Co.	114	281,607	42,616	341,706	20,333	20,163	1,377	55,995	.....	7,153	105,020	236,686	14,500	222,186	2,729
Oregon Short Line	2,255	2,491,295	1,093,319	3,913,641	550,085	437,859	74,670	862,982	73,721	104,933	2,102,024	1,811,617	228,379	1,581,620	156,981
Oregon-Washington R. R. & Nav. Co.	2,027	1,712,329	964,480	2,922,853	316,357	309,085	90,859	821,990	28,411	116,352	1,674,021	1,248,832	188,764	1,059,842	43,364
Panhandle & Santa Fe	670	528,850	181,792	749,067	208,471	139,709	8,042	186,151	.....	18,715	560,543	188,524	22,217	166,307	17,487
Pennsylvania Company	1,757	8,425,431	2,008,474	11,419,695	1,493,450	1,659,590	146,234	3,384,588	62,467	230,783	6,977,111	4,442,584	506,129	3,936,023	951,716
Pennsylvania Railroad	4,528	24,160,462	7,361,339	34,430,410	4,367,681	5,974,217	378,076	11,071,192	475,355	835,610	23,102,131	11,328,279	1,253,634	10,065,932	1,904,595
Pere Marquette	2,262	1,937,591	916,425	3,182,022	421,008	565,040	65,462	1,077,725	10,307	82,920	2,222,128	959,894	92,428	867,459	142,509
Philadelphia, Baltimore & Washington	717	2,114,102	1,375,318	3,825,613	526,153	692,809	52,684	1,430,203	49	97,682	2,799,580	1,026,034	109,152	916,695	224,693
Pittsburgh & Lake Erie	225	2,978,414	319,838	3,479,332	269,291	481,055	27,413	679,903	7,055	55,447	1,520,165	1,959,167	99,000	1,860,165	736,951
Pittsburgh, Cincinnati, Chic. & St. L.	1,479	4,877,347	1,533,111	7,137,931	1,015,776	1,244,535	130,340	2,328,827	52,477	159,695	4,931,650	2,206,281	320,185	1,885,440	50,686
Pittsburgh, Shawmut & Northern	294	298,247	20,592	325,591	60,404	78,368	3,405	91,958	.....	9,401	243,535	82,056	3,505	78,551	89,801
Richmond, Fredericksburg & Potomac	88	261,320	143,889	464,653	34,469	60,133	6,711	162,098	5,613	13,991	283,015	181,638	15,172	166,377	13,274
Rutland	468	322,298	239,389	640,955	92,694	105,222	20,731	211,307	2,141	10,744	442,838	198,118	33,721	164,397	40,097

Traffic News

W. L. Taylor, attorney for the Chicago, Indianapolis & Louisville, will address the Transportation Club of Indianapolis at its monthly dinner on October 18, on the subject of "The Panama Canal; Its Effect on the World's Transportation."

The New York, New Haven & Hartford announces that on its "Merchants' Limited" express train, leaving New York for Boston and Boston for New York at 5 p. m., two dining cars are now run. On one of them a regular dinner will be served, at $1.25, while on the other food may be orderd by the card.

The New York Central announces that the Twentieth Century Limited during the six months ended with August 31, arrived in New York on time 177 times, was 5 minutes late once, and was over 5 minutes late only 6 times. It also arrived in Chicago 177 times on time and was over 5 minutes late 7 times.

The United States Department of Agriculture announces that all federal restrictions on the movement of livestock because of foot-and-mouth disease have been removed in the states of Indiana, Michigan and Virginia. The whole country, with the exception of northern Illinois, is now practically free. The Union Stock Yards in Chicago are classed as a restricted area, in which livestock may be moved for immediate slaughter only.

The transcontinental railways have filed an application with the Interstate Commerce Commission for a fourth section order allowing them to extend to Pittsburgh territory the 55-cent rate on iron and steel articles, which now applies from Chicago and Mississippi river crossings to the Pacific coast. The steamship lines operating through the Panama Canal have announced their intention of opposing the rate by asking for a suspension of the tariffs.

It is now expected that the Panama canal may be blocked by the landslide two or three months, and the officers in charge will set no date when traffic can be resumed. It is estimated that ten million cubic yards of earth may be in motion. Of the ships detained on the Atlantic and the Pacific sides, aggregating more than 100, a considerable number have already been sent around Cape Horn. It is expected that ship owners desiring to transfer cargoes across the Isthmus by railroad will be allowed to do so at a rate of three dollars a ton.

Canadian Northern Excursion to the Coast

The first passenger train to run through from Montreal and Toronto to the Pacific coast terminus of the Canadian Northern left Toronto and Montreal on the evening of October 12. It carried officers of the road, members of the Canadian Parliament, newspaper men and a large number of other invited guests.

Car Impulses and Shortages

The American Railway Association's committee on relations between railroads, Arthur Hale, chairman, has issued statistical statement No. 9, giving a summary of freight car surpluses and shortages for October 1, 1915, with comparisons.

The total surplus on October 1, 1915, was 88,061; on September 1, 1915, 191,309, and on October 1, 1914, 133,382.

The surplus for September 1, 1915, shown above includes figures reported since the issue of statistical statement No. 8.

There is a general decrease in surplus under September 1, 1915, chiefly in groups 2 and 4 (East), group 5 (Southeast), group 6 (Central North), group 8 (Central), group 10 (West) and group 11 (Canada), in box cars; there being a considerable decrease in groups 6 and 11. There is also a decrease in the surplus of coal cars, chiefly in groups 2 (East) and 3 (Central North).

The total shortage on October 1, 1915, was 9,762; on September 1, 1915, 6,300, and on October 1, 1914, 2,355.

The shortage for September 1, 1915, shown above includes figures reported since the issue of statistical statement No. 8.

There is a general increase in shortage over September 1, 1915, excepting in group 2 (East) and group 3 (Central North), where there are slight decreases in the shortage of box cars; and in group 4 (East) where there is a decrease in the shortage of coal cars.

The figures by classes of cars follow:

Classes	Surplus	Shortage
Box	41,622	5,368
Flat	6,993	325
Coal and Gondola	16,563	3,251
Other	22,883	818
	88,061	9,762

Chicago Board of Trade Wants Railway Lake Service Continued

The Chicago Board of Trade has filed a petition with the Interstate Commerce Commission asking for permission to intervene in the case of the Lehigh Valley for a rehearing on its application to continue the operation of its lake lines. The board of trade also asks that the commission's order, effective on December 15, requiring the railroads to dispose of their lake lines, be postponed until the commission has heard further evidence on behalf of shippers interested in water transportation over the Great Lakes. The board of trade has also sent communications to other commercial organizations, suggesting a conference to be held with the purpose of sending a representative committee to Washington, asking for a postponement of the order and for a further hearing.

The board says in its petition to the commission, that for many years there has been "for the most part adequate facilities" in the way of boats on the Great Lakes, and that the "rates have been regulated largely by supply and demand," but that since several of the railroads have disposed of their interests in boat lines, the effect has been "to decrease the supply of boats and enormously advance the charges for transportation of grain" via water to eastern ports from Chicago; that these conditions "threaten to disrupt the means of transportation on which many members of your petitioner have long been depending for the marketing of their commodities, and which the geographical location of the city of Chicago entitles said members to rely upon, and that the disruption of, and curtailment of said means of water transportation will be destructive of the business of, and highly injurious to your petitioner, various members in the city of Chicago and many cities and towns located in the interior of the United States, which have been for many years past accustomed to ship the products of the farm through the port of Chicago."

In its letter to other organizations the board says that as a result of the commission's order, the port of Chicago and other Lake Michigan and Lake Superior points will be without regular boat line service to and from the east for the transportation of package freight, and in addition thereto the shippers of bulk grain will be deprived of the use of the so-called package boat lines for carrying bulk grain to Buffalo. Already, it says, some of the boats have been withdrawn from service, and the rates have been increased, and there is not sufficient boat space for the accommodation of package freight.

THE LONDON & SOUTH-WESTERN ELECTRIFICATION.—The London & South-Western has recently inaugurated electric traction on its London suburban lines and the new electric trains will soon be running between Waterloo and Wimbledon. Their use will be extended later. The trains used consist of three cars—a motor car at each end with a trailer between. There are two motors of 275 h.p. each per motor car, so that the total rating per train is 1,100 h.p. This is a much higher allowance than on the Metropolitan District, which gives 500 h.p. for two cars (motor car and trailer), or on the London tube railways, which have 500 h.p. for three cars (motor car and two trailers). The London & South-Western electric rolling stock is, however, much larger and heavier than that of the other lines mentioned. The carriages are standard British railway bogie coaches, and this, taken with the weight of the electric equipment on two cars out of every three, produces a heavy train in proportion to the number of cars composing it. It is evident that on the South-Western lines it is intended to develop high speed between the stations and to have a high rate of acceleration after each stop. There ought to be a great improvement in schedule speed as compared with the leisurely jog-trot of the existing suburban steam trains, and in fact, the South-Western's suburban traffic should be revolutionized.—*Railway Gazette, London.*

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended from November 1 to February 29 tariffs of seven New England roads proposing increased rates on milk and cream to Boston and other points.

Oral arguments on the application of the western railroads for advances in interstate passenger fares were presented before the Interstate Commerce Commission at Washington last week, by attorneys for the western railroads and by the representatives of the protesting state railway commissions.

The American Livestock Association, the National Wool Growers' Association, the Cattle Raisers' Association of Texas and the Corn Belt Meat Producers' Association have entered a protest with the Interstate Commerce Commission against granting a rehearing of the western rate advance case.

The Interstate Commerce Commission has extended from December 1 to December 15 the time within which railroads operating boat lines on the Great Lakes are required to dispose of their interests in the boats, in accordance with the commission's order of May 7, under the Panama Canal Act. The change was made to permit the companies to finish the navigation season.

Rates to La Crosse, Wis.

In re rates on agricultural implements and other commodities between La Crosse, Wis., and other points and St. Paul, Minn., and other points. Opinion by Commissioner Clements:

The commission finds that the carriers have not justified increased rates on agricultural implements, wagons, beer, conductor pipe, iron roofing, building and roofing paper, structural iron, linseed oil, etc., between La Crosse and other Wisconsin points taking the same rates and Minneapolis, St. Paul, Minnesota Transfer and Duluth, Minn., and other points.

The carriers contended that the existing rates were too low, and that the rates in this general section had recently been disturbed by the establishment in Minnesota of rates based upon mileage, and that this necessitated a readjustment in certain interstate rates, the proposed rates to and from La Crosse generally being the same as those established for the intrastate haul between Winona and the Minnesota points of origin or destination involved.

The commission believes, however, that there may be justification on a more adequate record for changes in the present adjustmnet of the rates involved in the present case. (36 I. C. C., 151.)

STATE COMMISSIONS

The Public Service Commission of New Hampshire has directed the railroads of the state to submit for approval regulations for providing stakes and wire for shipments of lumber on open cars. This order is in accordance with a law passed by the last legislature, designed to prohibit carriers from requiring shippers to bear the expense of stakes and wires. The idea of enforcing this rule as regards interstate shipments appears to have been given up.

COURT NEWS

Right to Build Across Highways

The Louisiana Supreme Court holds that a railroad company has an implied right to build across a highway, since otherwise the right granted by article 271 of the constitution "to construct and operate a railroad between any points within this state" would have to be abandoned. In exercising the right to cross, a railroad may obstruct the highway and the public be temporarily or perhaps permanently, compelled to find their own way around the obstruction; but such obstruction would not constitute an altering or changing, within the meaning of the statute.—Police Jury v. Tremont & G. Ry. Co. (La.), 67 So. 829.

"Passenger Train" May Consist Mainly of Freight Cars

In a suit upon a contract under which a subscriber agreed to pay $50 provided the railroad ran a regular passenger train along a specified route within two years, the Georgia Court of Appeals holds that a train operated on a fixed schedule is a "passenger train" within the meaning of the contract, if the train includes one or more cars for the accommodation and carriage of passengers under the regulations imposed by law for the transportation of passengers, notwithstanding it may include cars used exclusively for the transportation of freight.—Power v. Gainesville & Northwestern (Ga.), 86 S. E. 61.

Income Tax—Lessee's Agreement to Pay

A railroad company leased its property to another company by a lease which provided that the lessee should "pay all taxes and assessments . . . upon the yearly payments herein agreed to be made by the party of the second part to the party of the first part for the payment or collection of which . . . the said party of the first part would otherwise be liable,' and that the lessee should "pay all taxes . . . which, during the continuance of the term hereby demised, shall . . . be . . . imposed on the demised premises; . . . all payments required to be made by the party of the first part during the term of this indenture . . . shall be assumed and discharged by the party of the second part as if the party of the second part were primarily liable for the same." The Pennsylvania Supreme Court held that the lessor, having paid a tax under the federal income tax act on the income received under the lease, was entitled to recover it from the successor of the lessee.—North Pennsylvania v. Reading (Pa.), 95 Atl. 100.

Passengers on Freight Trains—Degree of Care Required

In an action for personal injury due to a violent jolt while riding in a caboose, the Circuit Court of Appeals for the Eighth circuit holds that an instruction to the jury that under the laws of Arkansas the defendant was required to carry passengers for hire upon its local freight trains, but not required to equip its cabooses like passenger cars, that one traveling in the caboose of a local freight train is bound to know that it is subject to more violent jerks in stopping and starting than passenger trains, and that the plaintiff assumed the risk of injury from any usual or ordinary jerk, stated the law correctly.—Kansas City Southern v. Clinton, C. C. A., 224 Fed. 896.

Independent Negligent Act of Employee

A railroad employee working at a coal chute coaling engines engaged in interstate commerce was injured while lifting the wheel of a coal buggy out of the hole it had broken in the rotten floor over which he was wheeling coal to the tipple. In an action against the railroad for his injuries the Alabama Supreme Court held that his act in lifting the buggy after it had fallen was an independent act and the proximate cause of the injury; and hence the negligence of the railroad company in failing to maintain a proper floor was not the continuous sequence proximately causing the injury, and it was not liable.—Southern v. Peters, Ala., 69 So. 611.

Expert Evidence as to Type of Derail Required

A locomotive engineer was killed by derailment at a derailing switch where a side track nine miles long ran into the main track. In a suit for damages the fact was cited that some derailing switches are very short, these usually being used in yards, while others are from 50 ft. to 250 ft. long, being in the nature of diverging tracks and being used generally where main tracks come together; and it was claimed that this siding 9 miles long was of the nature of a main track. The court found, however, that the class to which a track should be assigned depended on the use made of it, rather than its length; and also found that the derail with the long diverging track was customarily used where trains might be expected to run at high speed. The United States Circuit Court of Appeals, second circuit, holds that the question of which type should have been used at this particular place was an engineering problem, which should not have been left to the jury's decision.—(New York Central v. Banker, C. C. A., 224 Fed., 351).

Railway Officers

Executive, Financial, Legal and Accounting

E. R. Cassidy has been appointed claim agent of the New Orleans Great Northern, with office at Bogalusa, La., vice F. D. Blue, resigned.

Oliver G. Browne has been appointed assistant chief claim agent of the New York Central with headquarters at New York, vice Willis H. Failing, resigned, to accept service with another company.

Operating

John Wilfred Higgins, who has been appointed chairman of the General Managers' Association of Chicago and executive secretary of the Association of Western Railways, was born on October 12, 1864, at Newport, R. I. He entered railway service in October, 1879, as a messenger boy on the Illinois Central, and has since then held the following positions in railway service; June, 1881, to November, 1881, track laborer on the Illinois Central and the Toledo, Peoria & Western; December, 1881, to June, 1883, switchman on the Illinois Central; June, 1883, to August, 1883, telegraph operator; August, 1883, to October, 1884, freight and passenger brakeman and baggageman; October, 1884, to October, 1889, freight conductor; October, 1889, to April, 1890, chief clerk to the superintendent of the Chicago division; April, 1890, to December, 1891, trainmaster on the Centralia district of the Chicago division; December, 1891, to February, 1892, chief clerk to the general superintendent. From February to June, 1892, he was assistant superintendent of the Louisiana division, and from June, 1892, to January, 1893, superintendent of the same division. From January to April, 1893, he was superintendent of terminals of the Illinois Central and Yazoo & Mississippi Valley at New Orleans, La.; April, 1893, to April, 1896, superintendent of terminals at Chicago, Ill.; April, 1896, to April, 1899, superintendent of the Amboy division; May 1, 1899, to January 1, 1901, superintendent of transportation; January 1, 1901, to July, 1903, general superintendent of transportation of Illinois Central system. From September, 1903, to February, 1904, he was assistant superintendent of the Eastern division of the Grand Trunk; from February, 1904, to December, 1904, assistant superintendent of the Middle division of the same road; December, 1904, to March, 1905, inspector of transportation of the Missouri Pacific system; March 1, 1905, to January 1, 1912, assistant general manager, and from January 1, 1912, to November 1, 1915, general manager of the same system. His new appointment takes effect on November 1.

J. W. Higgins

A. W. McClelland has been appointed chief despatcher of the Northern Pacific with headquarters at Staples, Minn., vice A. M. Deverell, resigned. Effective October 1.

H. W. Gillette, assistant chief despatcher of the Northern Pacific, has been promoted to chief despatcher with headquarters at Jamestown, N. D., vice J. J. Mulroy, promoted. Effective October 1.

W. A. Kingsland, auditor of the Quebec lines of the Canadian Northern at Quebec, Que., has been appointed general superintendent of the Quebec lines with headquarters at Montreal, succeeding F. M. Spaidal, deceased.

Samuel Nicholson, trainmaster of the Norfolk & Western at Crewe, Pa., has been appointed assistant superintendent of the Norfolk division, with office at Petersburg, Va., and J. T. Ellett has been appointed trainmaster of the Norfolk division, with office at Crewe, vice Mr. Nicholson.

L. U. Morris, whose appointment as general superintendent of the El Paso & Southwestern has been announced, was born on November 7, 1873, at Winfield, Kan. He entered railway service on March 7, 1888, as office boy in the superintendent's office of the Atchison, Topeka & Santa Fe, at San Marcial, N. M. He remained with this road until September 18, 1905. During that time he successively held the following positions: telegraph operator, station agent, brakeman, conductor, trainmaster and division superintendent at Wellington, Kan. From September 18, 1905, until September, 1915, he was superintendent of the Eastern division of the El Paso & Southwestern, with headquarters at Tucumcari, N. M.

John J. Pelley, whose appointment as superintendent of the Yazoo & Mississippi Valley has been announced, entered the service of the Illinois Central as track apprentice on August 29, 1900. On August 1, 1904, he was appointed supervisor on the Indiana division, and on November 1, 1905, was transferred to the Memphis division of the Yazoo & Mississippi Valley. On January 15, 1908, he was appointed roadmaster on the Louisiana division of the Illinois Central, with headquarters at New Orleans, La. On June 6, 1911, he was transferred to the Tennessee division, and on May 10, 1912, was appointed superintendent of that division, with headquarters at Fulton, Ky. He remained there until September 15, 1915, when he was appointed to his present position.

P. J. Flynn, whose appointment as superintendent, districts 2 and 3, Central division, Canadian Northern, has been announced in these columns, was born at Fishers, N. Y., on November 22, 1872. He entered railway service on April 1, 1888, and since that time has held the following positions: until August 1, 1891, yard clerk of the Lehigh Valley, at Buffalo, N. Y.; from August 1, 1891, to April 1, 1892, night yardmaster same road, at Buffalo, N. Y.; from April 1, 1892, to January 24, 1894, yardmaster at the Tifft Farm yards of the same road, at Buffalo, N. Y.; from January 24, 1894, to November 1, 1898, general yardmaster of the same road, at Manchester, N. Y. On November 1, 1898, he was appointed assistant trainmaster of the Pennsylvania division of the same road, and on April 1, 1901, was appointed general yardmaster, at Sayre, Pa.; from February 1 to August 1, 1905, he was general yardmaster for the New York, New Haven & Hartford, at Worcester, Mass.; from August 1, 1905, to February 1, 1907, he was general yardmaster in charge of terminals for the same road, at Providence, R. I.; from February 1, 1907, to October 1, 1908, general yardmaster in charge of terminals for the Lehigh Valley, at Buffalo, N. Y.; from October 1, 1908, to January 1, 1913, trainmaster of the same road, at Buffalo, N. Y. From January 1, 1913, to August, 1915, he was terminals manager, Winnipeg joint terminals, of the Canadian Northern, the Grand Trunk and the National Transcontinental, at Winnipeg, Man.

Traffic

F. P. Kinney has been appointed assistant general freight agent of the New York, New Haven & Hartford Railroad and the Central New England, with headquarters at New Haven, Conn.

W. T. Bennett has been appointed agriculturist of the Central of Georgia with office at Savannah, Ga., succeeding T. G. Chastain, and W. C. Shannon has been appointed commercial agent with headquarters at Philadelphia, Pa., vice F. A. MacBride.

Edward Eden, district freight agent of the Canadian Pacific, at Omaha, Neb., has been promoted to assistant export freight agent, with headquarters at Chicago, Ill. C. E. Decker has been appointed to the position left vacant by Mr. Eden. G. C. Cochrane has been appointed district freight agent, with headquarters at Detroit, Mich., vice E. Olson, resigned.

Charles S. Lee, passenger traffic manager of the Lehigh Valley at New York, will retire from active service on October 31. Mr. Lee has been in continuous charge of the passenger traffic of this company for 22 years, and with the retirement of Mr. Lee the position of passenger traffic manager will be abol-

ished. A portrait of Mr. Lee and a sketch of his railway career were published in the *Railway Age Gazette* of December 4, 1914, page 1065.

C. H. Mitchell, general agent of the Chicago, Milwaukee & St. Paul at Duluth, Minn., has been appointed division freight and passenger agent at Great Falls, Mont., vice P. H. Scanlon, who has been appointed commercial agent at Helena, Mont. G. M. Bowman, commercial agent at Cincinnati, Ohio, succeeds C. H. Mitchell as general agent at Duluth, Minn. T. P. Casey, Canadian freight and passenger agent, with headquarters at Toronto, Ont., has been appointed commercial agent at Cincinnati, vice G. M. Bowman.

Richard Benjamin Miller, whose resignation as traffic manager of the Oregon-Washington Railroad & Navigation Company has been announced, was born at Silver City, Idaho, on April 8, 1870. He entered railway service in 1886 as office boy in the employ of the Oregon Railway & Navigation Company. From October 1, 1897, to September 1, 1901, he was assistant freight agent of the same company; from September 1, 1901, to May 15, he was general freight and passenger agent of the Southern Pacific lines in Oregon; from May 15, 1902, to January 1, 1910, general freight agent of the Oregon Railroad & Navigation Company; from September 15, 1905, to November 1, 1911, he was also general freight agent of the Southern Pacific lines in Oregon; from January 1, to December 23, 1910, also traffic manager of the Oregon Railroad & Navigation Company and the Oregon-Washington Railroad; from December 23, 1910, to November 1, 1911, traffic manager of the Oregon-Washington Railroad & Navigation Company, a merger of the Oregon Railroad & Navigation Company and the Oregon-Washington Railroad; from November 1, 1911, when the O. W. R. & N. Company and the Southern Pacific were segregated, until November 1, 1915, traffic manager of the former road.

R. B. Miller

Engineering and Rolling Stock

L. E. Faulkner, division engineer of the Mississippi Central at Hattiesburg, Miss., has been appointed chief engineer with office at Hattiesburg.

J. E. Gould has been appointed master mechanic of the Charlotte Harbor & Northern with office at Arcadia, Fla., vice W. H. McAmis, resigned to accept service elsewhere.

A. L. Graburn, mechanical engineer of the Canadian Northern at Toronto, Ont., has been appointed assistant superintendent of rolling stock of the Eastern lines, with office at Toronto, Ont.

V. R. Walling, first assistant engineer of the Chicago & Western Indiana, has been appointed principal assistant engineer, in charge of construction and maintenance, with office at Chicago.

August Fredericks has been appointed roadmaster of the Chicago, Milwaukee & St. Paul at Elgin, Ill., to succeed W. H. Kofmehl, resigned to join the sales force of the Chicago Malleable Castings Company.

W. W. Greenland, assistant engineer of the Wabash at Moberly, Mo., has been appointed engineer maintenance of way of the Western division, with headquarters at Moberly. E. Shelah, formerly engineer maintenance of way of the Decatur division, has been appointed engineer maintenance of way of the Springfield division, with headquarters at Springfield, Ill.

A. E. Eager, superintendent of shops of the Canadian Northern, at Winnipeg, Man., has been appointed assistant superintendent of rolling stock, with headquarters at the same city. A. McCowan, general car foreman, has been appointed supervisor of car work, at Winnipeg. H. W. Andrew, coach yard foreman at Winnipeg, has been appointed general car foreman, with headquarters at the same place, vice A. McCowan, promoted.

J. L. Hodgson, master car builder of the Grand Trunk, has been appointed general car foreman of the National Transcontinental, in charge of the car department at Transcona, Man., and of the car department at divisional points, Transcona to Ft. William inclusive, with office at Transcona. J. A. Mitchell has been appointed general foreman in charge of motive power, at Transcona.

C. E. Brooks, acting superintendent of motive power of the Grand Trunk Pacific, has been appointed superintendent of motive power, with office at Transcona, Man. He will also assume the duties of master car builder, J. L. Hodgson having resigned to enter the service of the National Transcontinental. E. Hacking, car foreman, at Prince George, B. C., has been appointed general car foreman, with headquarters at Transcona, Man. R. P. Graves, resident engineer, at Ft. William, Ont., has been transferred west of Winnipeg, Man.

Purchasing

C. E. Lepard, heretofore employed in the office of the locomotive foreman of the Canadian Northern at Regina, Sask., has been appointed division storekeeper, at that city, vice J. Butterfield, enlisted for active service.

OBITUARY

Thomas Powell Fowler, formerly from January, 1886, to September, 1912, president of the New York, Ontario & Western, died on October 12, at his summer home at Warwick, N. Y. Mr. Fowler was born on October 26, 1851, at Newburgh, N. Y., and graduated from Columbia Law School. In 1879 he became a director of the Shenango & Allegheny, now a part of the Bessemer & Lake Erie. Two years later he was elected a director of the Lehigh & Hudson River and in 1883 became a director of the West Pennsylvania & Shenango Connecting. In March, 1884, he was appointed receiver of the Shenango & Allegheny, and later in the same month was elected president of that road, and in July of that year became a director of the New York, Ontario & Western. In 1886 he became a director also of the Carthage & Adirondack. Mr. Fowler was elected president of the New York, Ontario & Western in January, 1886, resigning from that position, also as director of the same road, on September 25, 1912. A sketch of Mr. Fowler and of his work on the New York, Ontario & Western was published in the *Railway Age Gazette* of September 27, 1912, p. 582.

T. P. Fowler

O. F. Cole, chief engineer of the Arkansas, Louisiana & Gulf, died at Crossell, Ark., on September 27.

Benjamin S. Cable, formerly general attorney of the Chicago, Rock Island & Pacific, was killed in an automobile accident at Ipswich, Mass., on September 27. A graduate of Yale and the Columbia Law School, he entered the practice of law in Chicago, and for a number of years, up to 1909, served the Rock Island lines as local attorney, assistant general attorney and general attorney. During the Taft administration he was assistant secretary of commerce and labor.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE ATCHISON, TOPEKA & SANTA FE is reported as contemplating the purchase of 30 Mikado type locomotives.

THE WABASH will install superheaters on 45 Mikado type locomotives at its Decatur, Ill., shops. It is now completing the installation of superheaters on 18 engines, thus making 63 altogether.

CAR BUILDING

THE ANACONDA COPPER MINING COMPANY is inquiring for 14 dump cars.

THE CINCINNATI, HAMILTON & DAYTON is inquiring for 500 underframes.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for prices on 400 steel tie cars.

THE MISSOURI, KANSAS & TEXAS has been authorized by the court to purchase 200 ballast cars.

THE NEW YORK CENTRAL, reported in last week's issue of the *Railway Age Gazette* as having ordered 500 freight cars for the Michigan Central from the Haskell & Barker Car Company, ordered 500 automobile cars from this company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered steel underframes and superstructures for 500 box and 20 caboose cars from the American Car & Foundry Company and will complete the building of the cars in its own shops.

THE CINCINNATI, INDIANAPOLIS & WESTERN, B. A. Worthington, general manager, Indianapolis, Ind., has issued inquiries for 15 steel coaches and is also reported in the market for 3 steel postal cars, 9 steel baggage cars and one steel dining car.

IRON AND STEEL

THE PITTSBURGH & LAKE ERIE has ordered 5,000 tons of rails from the Carnegie Steel Company.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 2,500 tons of rails from the Carnegie Steel Company.

THE JAMESTOWN RAILWAY has ordered 550 tons of structural steel from the Empire Structural Steel Company.

THE PHILADELPHIA & READING has ordered 3,000 tons of steel from the Pennsylvania Steel Company for a bridge at Sunbury, Pa.

THE ILLINOIS CENTRAL has ordered 1,000 tons of steel from the American Bridge Company for a car repair shop at Nonconnah, Tenn.

THE NORTHERN PACIFIC has ordered 813 tons of steel from the American Bridge Company for grade separation bridges at Spokane, Wash.

THE CHICAGO & MILWAUKEE ELECTRIC has ordered 225 tons of steel from the Wisconsin Bridge & Iron Company for a bridge near Milwaukee, Wis.

THE BALTIMORE & OHIO has divided an order for 62,500 tons of rails among the Maryland Steel Company, the Cambria Steel Company, the Carnegie Steel Company and the Illinois Steel Company.

BRITISH LOCOMOTIVE EXPORTS.—There was some improvement in August in the exports of locomotives from the United Kingdom, the increase occurring especially in shipments to British India. The value of the exports to the Argentine Republic rallied in August to $220,000, as compared with $45,000 in August, 1914, and $450,000 in August, 1913. The aggregate value of the shipments in all directions in August was $1,400,000, as compared with $1,050,000 and $1,500,000.

Supply Trade News

W. M. White has resigned as sales manager of The Esterline Company, of Indianapolis, Ind., manufacturers of "Golden Glow" headlights.

The Bucyrus Company, South Milwaukee, Wis., has opened an office at 900 Hibernian Building, Los Angeles, Cal., in charge of G. H. Hutchinson.

Fairbanks, Morse & Co. have been awarded a contract by the Detroit Terminal Railroad for a conveyor type coaling station of large capacity to be erected at North Detroit, Mich.

Ambrose N. Diehl has been appointed assistant superintendent of the Duquesne steel works of the Carnegie Steel Company, succeeding Edward J. Hamilton, recently made general superintendent.

Robert E. Belknap, whose appointment as district sales manager of the Pennsylvania Steel Company and the Maryland Steel Company at New York City was announced in this column last week, graduated from Johns Hopkins University in 1897, and in the following year aided in the construction of the Eighth avenue and Sixth avenue underground trolley conduits for the Metropolitan Street Railway of New York city, as assistant to the engineer of the National Contracting Company. In 1901 he entered the employ of the Pennsylvania Steel Company and Maryland Steel Company. After a thorough training in the rail, frog and switch departments, billet mill, steel foundry and bridge shop, and the forging, machine and marine departments, he was attached to the general sales office at Steelton, Pa. In July, 1902, he came to the then new Chicago sales office as assistant sales agent and western representative, and in 1906 was made district sales manager. Mr. Belknap was president of the National Railway Appliances Association for the year 1911-12.

R. E. Belknap

The Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., manufacturers of electrical connectors and cable grips, has opened a New York City office in the Vanderbilt Concourse building, 52 Vanderbilt avenue.

Early in the year Joseph T. Ryerson & Son announced a contest for a trade name for its line of tool steel. A $100 prize was offered for the best name, and over 10,000 names were entered in the contest. The judges have decided on the word "Ryolite" as the winning name.

The Roberts & Schaefer Company, Chicago, has recently received a contract from the Nashville, Chattanooga & St. Louis for the construction of a modern fireproof reinforced concrete coaling plant at Cowan, Tenn. The plant will be designed to coal locomotives on four tracks and equipped with automatic electric elevating facilities supplying coal to a 250-ton storage pocket. The contract price is about $17,500.

H. A. Varney, general sales manager of the National Boiler Washing Company, Chicago, has resigned to become manager of the railroad department of the Smith-Totman Company with offices in the People's Gas Building, Chicago. Mr. Varney was born at Spencer, Iowa, on September 9, 1877, and was educated at the public schools of his native city and at the Iowa Agricultural College. He came into the railway supply field in

1906 as a member of the construction force of the W. L. Miller Heating Company. He joined the sales force of the National Boiler Washington Company in 1909, and was later promoted to the position with that company which he now resigns.

The Union Switch & Signal Company announces the appointment of George A. Blackmore as general sales manager in charge of the activities of the New York, Montreal and Atlanta offices, with headquarters at New York. Resident managers A. Dean and T. H. Patenall, of New York and Montreal, respectively, and sales engineer Brastow, of Atlanta, will report to him. He will eventually be located at Swissvale in charge of sales, construction and commercial engineering. A sketch and photograph of Mr. Blackmore appeared in the *Railway Age Gazette* of September 4, 1914, at the time he went to the Bryant Zinc Company, New York, as its vice-president.

TRADE PUBLICATIONS

Factory and Office Equipment.—The Manufacturing Equipment & Engineering Company, Boston, Mass., has recently issued three books relating respectively to the company's sanitary bubbling fountains, its line of sanitary washbowls and its metal lockers for factory, office and other use.

Methods of Constructing Large Capacity Deep Wells.—The American Well Works has issued a bulletin explaining the advantages of drilled wells having a diameter as large as 30 in. The methods used in drilling these large diameter wells and the special equipment necessary are described in detail.

Steam Shovels.—The American Steel Dredge Company, Fort Wayne, Ind., has issued Bulletin No. 10, describing the company's "single-line" revolving steam shovels. The booklet is well illustrated with both photographs and diagrams, and claims increased efficiency for the excavator through reduced friction and a wider digging angle.

Kerosene Torches.—The Hauck Manufacturing Company, Brooklyn, N. Y., has recently issued bulletin No. 60, entitled, Saving Ways in Busy Shops, dealing with the company's burners and furnaces for kerosene and other oil fuel. The booklet contains a number of illustrations of the various burners and others showing the work which may be done by them.

Saving Set-Ups in Railroad Shops.—This is the title of a booklet which has recently been issued by the Lucas Machine Tool Company, Cleveland, Ohio. The booklet relates particularly to the Lucas "Precision" boring, drilling and milling machine and aims to show wherein that machine is productive of efficiency in the railroad shop. The catalog is well illustrated and attractively gotten up.

Minwax Products.—The Minwax Company, New York City, has issued Bulletin No. 1 of a proposed series, which gives briefly a description of its system of waterproofing, with the specifications; and photographs of the use of this material on numerous structures, including the Martin's Creek viaduct of the Lackawanna, this product being used on this structure as well as on the Tunkhannock viaduct.

Flue Tools.—Gustav Wiedeke & Co., Dayton, Ohio, have recently issued a 96-page catalog descriptive of the Ideal flue tools manufactured by the company. The booklet describes and illustrates the line of Wiedeke Ideal tube expanders, cutters and accessories. Each tool mentioned is described and in connection with the description there are given specifications, price lists, and detailed views of the tool and its parts.

Fireproof Floors and Bearing Partitions of Pressed Steel Construction.—This pamphlet issued by the Trussed Concrete Steel Company, Youngstown, Ohio, illustrates the use of a form of fire-resisting construction involving the use of Kahn pressed steel I-beams and H-studs. Fifteen standard sections are provided, of depths varying from 3 to 12 in. and having an appearance somewhat similar to the standard rolled I-beam. They are made of two pressed steel troughs riveted together back to back, the edges of the bases being turned in to a depth of ½ in. The pamphlet illustrates the wide flexibility with which this form of structural material may be applied. In general, it is intended to covers the studs and beams on each side with a metal lath or mesh such as Hy-Rib, to facilitate the application of concrete surfaces.

Railway Construction

Atchison, Topeka & Santa Fe.—The report of this company for the year ended June 30, 1915, shows that the Minkler Southern, from Minkler, Cal., to Exeter, aggregating with two short branches, 43.71 miles, was completed and opened for traffic in October, 1914, and an extension from Exeter to Lindsay, 6.95 miles, has since been built, and placed in operation. The Oil Fields & Santa Fe was formed to buy certain lines extending from Cushing, Okla., to Pemeta, and from Jennings to Oilton, reaching the Cushing oil field. A line from Pemeta to Oilton, connecting these railroads and an extension from Pemeta to Drumright are now under construction, a total of about 27 miles, including the lines that have been bought and those now under construction. On the Northwestern Pacific, which is owned jointly by the Santa Fe and the Southern Pacific, track laying has been finished on the gap between Willets, Cal., and Shivley, which are 105.64 miles apart, and the line was placed in operation in July, 1915.

Athabasca & Fort Vermillion.—The preliminary survey being made for the line projected from Athabasca, Alta., northwesterly to Trout Lake and to Fort Vermillion, about 300 miles, has been made to Wabiscaw, it is said, and two possible points located for building a bridge over the Athabasca river. A. C. Galbraith, chief engineer. (June 25, p. 1497.)

Dallas & Southwestern Traction.—This company, which was organized to build an electric line from Dallas, Tex., south, has surveyors now in the field, it is said, locating the line from Dallas southwest via Cleburne, and Glen Rose to Stephenville, about 100 miles. It is said that financial arrangements have been made and construction work will be started as soon as survey now in progress between Stephenville and Glen Rose is finished. E. P. Turner, president, Dallas. (Aug. 13, p. 301.)

Denver & Rio Grande.—This road is making a preliminary survey for a line from Alamosa, Colo., to Durango.

Edmonton, Dunvegan & British Columbia.—Track laying on the extension of this road is reported finished on a temporary bridge over the Big Smoky river at mileage 290 from Edmonton, Alta., and track laying is under way to the Spirit river, on 67 miles additional. A permanent bridge is being built over the Big Smoky river. The line is now in operation from Edmonton, Alta., to McLennan, 261.7 miles. Grading work on an additional line through the Grande Prairie district is under way on about 60 miles, and the company expects to have the track laying completed on this section during 1915. (July 30, p. 619.)

Lula-Homer Railroad.—An officer writes that the plans call for building from Belton, Ga., southeast to Homer, thence east via Cinesville to Hartwell and then northeast to Anderson, S. C., 82 miles. Grading work has been finished on 73 per cent of the section from Lula to Homer. The contract for all the grading, erection of buildings and track laying, also for equipping the line, has been let to W. J. Redmond, Atlanta, Ga., and construction work will be started on October 15. Arrangements have been made to dispose of a bond issue of $165,000 6 per cent 40-year gold bonds. C. J. Hood, president of the Northeastern Banking Association, is president of the railroad, Commerce, Ga. D. G. Ziegler, chief engineer, Lula, Ga. (March 26, p. 720.)

Minkler Southern.—See Atchison, Topeka & Santa Fe.

New York Subways.—The New York Public Service Commission, First district, has approved the plans and form of contract for the reconstruction of the Brighton Beach elevated line in the borough of Brooklyn. This involves the reconstruction of the line from Church avenue north to Malbone street and the widening of this section from two to four tracks, also the reconstruction of three stations, at a cost of from $750,000 to $1,000,000. From Sheepshead Bay south the line is to be elevated into Coney Island and four-tracked. The line is also to be connected by a new two-track subway branch through Flatbush avenue at Malbone street with the Fourth avenue subway near the Long Island terminal at Atlantic and Flatbush avenues.

The commission has approved the contract and plans for the construction of foundations and structure of Section No. 2 of the Jamaica elevated extension. This comprises 2.2 miles of two-track elevated railroad from Walnut street along Jamaica avenue to Cliffside avenue. The commission has also approved the form of contract for the erection of steel for additional tracks on the Myrtle avenue line from Willoughby avenue to Palmetto street, and for certain additional work on the Lutheran Cemetery line.

NORTHWESTERN PACIFIC.—See Atchison, Topeka & Santa Fe.

OIL FIELDS & SANTA FE.—See Atchison, Topeka & Santa Fe.

SALT LAKE & OGDEN (ELECTRIC).—This road is laying a second track between Orchard station, Utah, and Clinton station, a distance of about three miles. Grading has been completed and rails will be laid upon receipt of ties. A combined roadway and aqueduct overhead crossing will be built to eliminate a grade crossing. The viaduct will be 40 ft. long and will be built by company forces. Bids for steel opened on October 5.

SOUTH CAROLINA ROADS (ELECTRIC).—Surveys have been made for a line to be built from Sumter, S. C., east via Goodwill, in Shiloh township, to Turbeville, thence northeast to Olanto, 32 miles. The line may eventually be extended from Olanta southeast to Lake City, in all about 47 miles. Rights of way have been secured on about 75 per cent of the section between Olanto and Sumter, and free station sites and terminal sites will be guaranteed on this section. The Chamber of Commerce of Sumter has paid for the necessary surveys and owns the title to three-fourths of the right of way, and is looking for capital to build and operate the line. The promoters expect that the line will develop a traffic in timber, cotton, corn, tobacco, livestock and general farm products. Residents of Sardinia, in Clarendon county, about four miles from Turbeville, want a branch built north to Turbeville. E. I. Reardon is managing secretary of the Chamber of Commerce at Sumter. (Oct. 8, p. 670.)

SOUTH DAKOTA & WESTERN.—This company has filed articles of incorporation in South Dakota with a capital of $1,000,000 and headquarters at Yankton. The plans call for building from Mitchell, in Davison county, S. D., southwesterly through Davison, Aurora, Douglas and Charles Mix counties to Platte in that county, thence northwest to a point in Brule county near Chamberlain, about 80 miles. The incorporators included W. L. Bruce, W. E. Heaton, A. A. Loft, E. A. Bruce and J. J. Orr, all of Yankton, S. D.

ST. JOHN & QUEBEC.—The Provincial government of New Brunswick has taken over the charter of this company and after an adjustment and settlement of outstanding claims arising out of the construction of the 120 miles between Gagetown, N. B., and Centreville have been arranged, will complete the construction of the line. The company was organized to build from Grand Falls, N. B., southeast following the St. John river to St. John, about 210 miles. The sections yet to be built are from Centreville north to Grand Falls and from Gagetown south to St. John. The section from Frederickton to Centreville, 88 miles, is now being operated by the Canadian Government Railways. (June 4, p. 1182.)

RAILWAY STRUCTURES

BEAUMONT, TEX.—This city is asking for bids on the construction of a proposed municipal freight terminal. Bids will be received on November 2, and specifications provide that the terminal must be completed by February 15, 1916.

KANSAS CITY, MO.—James Stewart & Co. of New York have been awarded a contract for the superstructure of a new addition to the Chicago, Milwaukee & St. Paul elevator. The improvement involves reinforced concrete construction and will cost in the neighborhood of $65,000.

MARSHALL, TEX.—The Texas & Pacific is preparing plans for new shops to replace those destroyed recently by fire.

NASHOTAH, WIS.—The Chicago, Milwaukee & St. Paul has awarded a contract for a new station to Gunder Anderson of Oconomowoc, Wis. It will be a tile and concrete structure and will cost about $10,000.

Railway Financial News

CAROLINA, ATLANTIC & WESTERN.—See Seaboard Air Line.

HOCKING VALLEY.—Kuhn, Loeb & Co. and the National City Bank, both of New York, bought from the Hocking Valley and sold to the public $4,000,000 two-year 5 per cent notes. The proceeds will be used to pay off a like amount of one-year 6 per cent notes which mature November 1.

LEXINGTON & EASTERN.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—The Lexington & Eastern, which runs from a point on the Louisville & Nashville to a point in the eastern Kentucky coal fields, about 100 miles, has been taken over by the Louisville & Nashville.

George C. Jenkins, of Baltimore, has been elected a director of the Louisville & Nashville, succeeding Michael Jenkins.

MISSOURI PACIFIC.—The Union Trust Company of New York, as trustee of the first and refunding mortgage of the St. Louis, Iron Mountain & Southern, has begun suit in the federal district court at St. Louis to foreclose this mortgage.

SEABOARD AIR LINE.—Directors approved the consolidation of the Seaboard Air Line with the Carolina, Atlantic & Western. Common stock of the new company to the amount of $40,041,000 is to be issued in equal exchange for the old Seaboard stock, of which there is $37,516,000, and for the Carolina, Atlantic and Western stock, of which there is $2,525,000. Of the $27,280,000 new preferred stock $2,280,000 is to be exchanged for an equal amount of the 5 per cent refunding bonds of the Carolina, Atlantic & Western. This stock is to bear 6 per cent non-cumulative dividends. The balance is to be exchanged for an equal amount of old Seaboard preferred. The dividend rate on this class of new preferred will be the same as at present, 4 per cent regular, with an additional 2 per cent after 4 per cent is paid on the common.

WABASH.—The Wall Street Journal comments on the Wabash reorganization as follows:

A total of $39,498,928 first refunding and extension 4 per cent bonds out of a total issue of $40,600,000 were deposited with the reorganization committee under an agreement to underwrite the cash assessment not subscribed for by the stockholders. After it was determined how many stockholders had paid their assessments it was announced that the proportion of the total assessment required from the refunding 4 per cent bondholders would be $654.82 per $1,000 bond, indicating that only about 4 per cent of the stockholders paid their assessment and that the bondholders were therefore obligated for the payment of the balance of the $27,720,000 cash to be raised by assessment or for a total of $26,583,480.

Out of the $39,498,928 deposited bonds which agreed to underwrite the cash assessment, 98.5 per cent have either paid in the initial instalment of 10 per cent or have paid their obligation in full. The 1.5 per cent which have not paid so far, probably represents deferred payments which will be received in the course of a few days, inasmuch as the final day for receiving payment was only last Saturday. It is expected that eventually all the deposited bonds will make payment, inasmuch as no protest of any kind has been received from any bondholders concerning the plan of reorganization or the amount of the payment which fell upon them. The very small amount of undeposited bonds is said to represent foreign and isolated holdings that cannot be reached.

FREIGHT TRAFFIC RECEIPTS OF GERMAN STATE RAILWAYS.—It is reported from Berlin that the freight traffic of the German State railways to the end of the first year of war has almost reached the normal amount of the previous year. In August, 1914, they amounted to 41.6 per cent of the previous year; in January, 1915, 90.1 per cent; June, 1915, 96.1 per cent, and in July, 1915, 97.6 per cent of the previous year. If the frontier region traffic, which, owing to the state of war, has specially suffered, say about 2 per cent be deducted, then the figure for the previous year is almost exactly the same.

[ADVERTISEMENT]

ANNUAL REPORT

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY—TWENTIETH ANNUAL REPORT

OFFICE OF

THE ATCHISON, TOPEKA & SANTA FE RAILWAY SYSTEM

No. 5 Nassau Street, New York City

SEPTEMBER 14, 1915.

To the Stockholders:

Your Directors submit the following report for the fiscal year July 1, 1914, to June 30, 1915, inclusive:

The Lines comprising the Atchison System, the operations of which are embraced in the following statements, are as follows:

	June 30, 1915	June 30, 1914
Atchison, Topeka & Santa Fe Railway	8,513.48 miles	8,339.72 miles
Rio Grande, El Paso & Santa Fe Railroad	20.22 "	20.22 "
Gulf, Colorado & Santa Fe Railway	1,937.71 "	1,595.89 "
Pecos & Northern Texas Railway	..... "	569.79 "
Panhandle & Santa Fe Railway	665.02 "	179.16 "
Texas & Gulf Railway	..... "	125.49 "
Gulf & Interstate Railway of Texas	..... "	71.33 "
Concho, San Saba & Llano Valley Railroad	..... "	59.63 "
	11,136.43 "	10,961.23 "

Increase during the year 175.20 miles.

The average mileage operated during the fiscal year ending June 30, 1915, was 11,114.52 miles, being an increase of 206.00 miles as compared with the average mileage operated during the preceding fiscal year.

Under leases effective July 1, 1914, th lines of the Pecos & Northern Texas Railway north of Sweetwater, Texas, were operated by the Panhandle & Santa Fe Railway, and the lines of the Texas & Gulf Railway, Gulf & Interstate Railway of Texas, Concho, San Saba & Llano Valley Railroad and Pecos & Northern Texas Railway south of Sweetwater by the Gulf, Colorado & Santa Fe Railway.

In addition to lines covered by this report there were completed on June 30, 1915, 25.70 miles of additional line, all of which will be ready for operation in the near future.

The Company also controls, through ownership of stocks and bonds, other lines aggregating 228.92 miles, and is interested jointly with other companies in 606.08 miles.

For detailed statement of present mileage and of changes in mileage since last Annual Report, see pages 43 to 47.

INCOME STATEMENT

The following is a summary of the transactions of the System for the years ending June 30, 1914, and 1915:

	1914	1915
Operating Revenues	$111,109,769.86	$117,665,587.46
Operating Expenses	73,469,333.68	76,091,553.69
Net Operating Revenue	$37,640,436.18	$41,574,033.77
Taxes	5,525,585.30	5,497,316.77
Uncollectible Railway Revenues	.....	25,316.43
Operating Income	$32,114,850.88	$36,051,400.57
Other Income	2,174,353.12	2,997,150.47
Gross Corporate Income	$34,289,204.00	$39,048,551.04
Rentals and Other Charges (see note)	1,218,827.08	2,131,942.03
	$33,070,376.92	$36,916,609.01
Interest on Bonds, including accrued interest on Adjustment Bonds	12,886,412.23	12,785,747.10
Net Corporate Income (representing amount available for dividends and surplus and for necessary but unproductive or only partially productive expenditures)	$20,183,964.69	$24,130,861.91

From the net corporate income for the year the following sums have been deducted:

DIVIDENDS ON PREFERRED STOCK—		
No. 33 (2½%) paid Feb. 1, 1915	$2,854,343.25	
No. 34 (2½%) paid Aug. 2, 1915	2,854,343.25	
	$5,708,686.50	
DIVIDENDS ON COMMON STOCK—		
No. 37 (1½%) paid Sept. 1, 1914	$2,942,407.50	
No. 38 (1½%) paid Dec. 1, 1914	2,942,632.50	
No. 39, (1½%) paid Mar. 1, 1915	2,959,147.50	
No. 40 (1½%) paid June 1, 1915	2,997,142.50	
	11,841,330.00	
Appropriation for Fuel Reserve Fund	54,502.78	
California-Arizona Lines Bonds Sinking Fund	12,945.67	
Appropriated for Additions and Betterments	6,513,396.96	
		$24,130,861.91
Surplus to credit of Profit and Loss June 30, 1914		$20,569,800.81
Additions to Profit and Loss Account (Sundry Adjustments)		11,421.10
Surplus to credit of Profit and Loss June 30, 1915		$20,581,221.91

NOTE.—The increase of $913,114.95 in "Rentals and Other Charges" occurs chiefly in the item "Hire of Equipment," due mainly to the large grain crop and the necessity for using "foreign" cars to a greater extent than usual in handling it.

Income from sources other than earnings from operation consisted of interest on cash in banks and sums collected as interest and dividends upon bonds and stocks of companies, the operations of which are not included in the System accounts.

CAPITAL EXPENDITURES AND REDUCTION OF BOOK VALUES

The total charges to Capital Account, as shown by the General Balance Sheet, page 26, at June 30, 1915, aggregated $683,855,314.09 as compared with $671,814,299.94 at June 30, 1914, an increase during the year of $12,041,014.15, which analyzes as follows:

Construction and acquisition of new mileage, including the acquisition of bonds and stocks of other railway and terminal companies:		
Dodge City & Cimarron Valley Ry	$11,430.34	
Eastern Ry. of New Mexico	5,243.10	
Grand Canyon Ry	18,405.75	
Minkler Southern Ry	370,888.27	
Oil Fields & Santa Fe Ry	370,072.20	
Northwestern Pacific R. R	155,800.00	
Rocky Mountain & Santa Fe Ry	3,000,000.00	
Union Passenger Depot Co. of Galveston	292,565.87	
Verde Valley Ry	24,000.00	
		$4,248,405.53
Additions and Betterments—System Lines:		
Fixed Property	$5,115,796.42	
Additional Equipment	2,464,431.34	
Betterments to Equipment	21,121.05	
		7,601,348.81
Fuel Lands and Other Properties:		
Real Estate held for future use	$154,038.72	
Tie and Timber Lands	23,700.91	
Miscellaneous Items	112,757.67	
		290,497.30
Other Investments		219,689.34
Total Charges		$12,359,940.98
Reduction of Book Values:		
California, Arizona & Santa Fe Ry	$4,299.11	
San Francisco Terminal Property	6,000.00	
Western Oklahoma Ry	44,645.10	
Ice Plant, Belen	12,000.00	
Ice Plant, San Bernardino	59,792.89	
Santa Barbara Tie & Pole Co	7,189.73	
Fuel Lands	185,000.00	
		318,926.83
Net Increase in Capital Account during the year		$12,041,014.15

The item of $2,464,431.34 for "Additional Equipment" analyzes as follows:

727	Freight-Train Cars	$907,775.40
142	Passenger-Train Cars	2,455,292.99
1,927	Miscellaneous Work Cars	250,114.36
5	Miscellaneous Equipment	2,793.97
		$3,615,976.72
	Less—Value of Equipment retired during the year as follows:	
47	Locomotives	$198,078.47
2,789	Freight-Train Cars	881,085.34
10	Passenger-Train Cars	30,259.48
107	Miscellaneous Work Cars	37,381.97
	Adjustment of charges for locomotives received in prior year	4,740.12
		$1,151,545.38
		$2,464,431.34

The 1,927 miscellaneous work cars included in equipment added and the 2,789 freight-train cars reported as retired include 1,925 cars, which, being permanently assigned to work service, were relettered in work service equipment series during the year and transferred from freight equipment to work service equipment at their depreciated value at time of relettering.

In addition to the equipment reported retired as above, 33 freight-train cars leased from the Oklahoma Central Railroad Co. were also retired during the year and liability therefor included in Other Unadjusted Credits in the General Balance Sheet.

MAINTENANCE OF EQUIPMENT

The following statement shows the sums charged to Operating Expenses for Maintenance of Equipment during each year since July 1, 1896:

Year ending June 30	Average Operated Mileage	Total Expenditure	Expenditure per Mile
1897	6,443.81	$3,443,884.82	$534.45
1898	6,936.02	4,659,277.99	671.75
1899	7,032.62	4,810,795.64	684.07
1900	7,341.34	5,267,832.40	717.56
1901	7,807.31	6,257,456.57	801.49
1902	7,855.38	7,864,951.25	1,001.22
1903	7,965.13	8,510,543.09	1,068.48
1904	8,179.59	10,006,135.41	1,223.31
1905	8,305.40	10,914,864.47	1,314.19
1906	8,433.99	10,720,040.43	1,271.05
1907	9,273.15	11,779,846.64	1,270.32
1908	9,415.01	14,246,621.44	1,513.18
1909	9,794.86	13,903,897.37	1,419.51
1910	9,916.33	15,560,047.44	1,569.13
1911	10,350.13	16,686,145.45	1,612.17
1912	10,627.92	16,521,231.41	1,554.51
1913	10,750.31	19,415,224.63	1,806.02
1914	10,908.52	19,100,724.51	1,750.99
1915	11,114.52	19,764,535.40	1,778.26

For the year ending June 30, 1915, maintenance charges, including renewals and depreciation, averaged as follows:

Per locomotive	$4,600.26
Per locomotive mile	.1674
Per freight car	128.99
Per freight car mile	.0119
Per passenger car, including mail and express	1,203.56
Per passenger car mile	.0139

The foregoing average maintenance charges include a proportion of unlocated expenditures for Maintenance of Equipment charged to Superintendence, Shop Machinery, Injuries to Persons, Insurance, Stationery and Printing, Other Expenses, and Maintaining Joint Equipment at Terminals. Refrigerator cars are not taken into consideration in arriving at freight car averages, such cars being operated by The Santa Fe Refrigerator Despatch Company, which bears the expense of their maintenance.

MAINTENANCE OF WAY AND STRUCTURES

The following statement shows the sums charged to Operating Expenses for Maintenance of Way and Structures during each year since July 1, 1896:

Year ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure per Mile.
1897	6,443.81	$6,282,923.15	$975.03
1898	6,936.02	8,281,397.88	1,193.97
1899	7,032.62	7,672,107.62	1,090.93
1900	7,341.34	6,354,372.10	865.56
1901	7,807.31	6,433,840.36	824.08
1902	7,855.38	6,141,466.39	781.82
1903	7,965.13	9,304,892.04	1,168.20
1904	8,179.59	9,170,234.07	1,121.11
1905	8,305.40	11,385,418.33	1,370.85
1906	8,433.99	12,475,407.97	1,479.18
1907	9,273.15	15,286,062.66	1,648.42
1908	9,415.01	14,120,828.02	1,499.82
1909	9,794.86	12,884,406.81	1,315.43
1910	9,916.33	17,807,136.20	1,795.74
1911	10,350.13	16,059,786.90	1,551.65
1912	10,627.92	16,076,833.75	1,512.70
1913	10,750.31	18,054,413.03	1,679.43
1914	10,908.52	15,308,780.25	1,403.38
1915	11,114.52	16,514,467.89	1,485.85

COMPARISON OF OPERATING RESULTS

The following is a statement of revenues and expenses of the System for the fiscal year ending June 30, 1915, in comparison witth the previous year:

	Year Ending June 30, 1915.	Year Ending June 30, 1914.	Increase.	Decrease.
OPERATING REVENUES:				
Freight	$80,504,393.33	$73,638,388.01	$6,866,005.32	
Passenger	27,823,063.87	28,497,232.68		$674,168.81
Mail, Express and Miscel.	9,338,130.26	8,974,149.17	363,981.09	
Total Operating Revenues	$117,665,587.46	$111,109,769.86	$6,555,817.60	
OPERATING EXPENSES:				
Maintenance of Way & Structures.	$16,514,467.89	$15,425,729.81	$1,088,738.08	
Maintenance of Equipment	19,764,535.40	19,213,342.69	551,192.71	
Traffic	2,649,174.86	2,521,773.79	127,401.07	
Transportation—Rail Line.	34,827,705.34	33,899,108.43	928,596.91	
General	2,476,595.20	2,409,378.96	67,216.24	
Transportation for Invest.—Cr.	*140,925.00*			$140,925.00
Total Operating Expenses	$76,091,553.69	$73,469,333.68	$2,622,220.01	
Net Operating Revenue	$41,574,033.77	$37,640,436.18	$3,933,597.59	
Ratio of Operating Expenses to Operating Revenues.	64.67	66.12		1.45

Credits in italics.

NOTE.—The Operating Expenses by general accounts used for comparative purposes are not the same as shown in the last annual report, but are revised in accordance with Classification of Operating Expenses as prescribed by the Interstate Commerce Commission, effective July 1, 1914.

The average tons of freight (revenue and company) per loaded car mile increased from 18.75 to 19.71, or 5.12 per cent.

The average tons of freight (revenue and company) carried per freight-train mile (freight and mixed) increased from 420.45 to 442.04, or 5.13 per cent.

The average freight revenue per freight-train mile increased from $3.47 to $3.55, or 2.31 per cent.

The average passenger revenue per passenger-train mile decreased from $1.17 to $1.09, or 6.84 per cent.

The average passenger train revenue per passenger-train mile decreased from $1.45 to $1.37, or 5.52 per cent.

The tons of freight carried one mile (revenue and company) increased 1,099,152,546, or 12.33 per cent., while miles run by freight cars (loaded and empty) in freight and mixed trains increased 66,620,201, or 9.82 per cent., and the mileage of such trains increased 1,450,807, or 6.84 per cent.

The number of passengers carried one mile increased 31,618,391, or 2.41 per cent., while miles run by passenger cars in passenger and mixed trains increased 10,362,341, or 7.41 per cent., and the mileage of such trains increased 1,213,955, or 4.98 per cent.

While freight operating revenues increased 9.32 per cent., the freight service rendered, as measured by tons transported one mile, increased 12.33 per cent.; and while earnings from passengers carried decreasd 2.37 per cent, the passenge service rendered, as measured by passengers carried one mile, increased 2.41 per cent.

The following is a consolidated statement of the business of the System for each fiscal year during the period since January 1, 1896:

Fiscal Year Ending June 30.	Average Miles Operated.	Gross Revenues, Including Income from Other Sources.	Expenses, Including Taxes, Rentals and Other Charges.	Interest on Bonds.	Net Corporate Income.
1897 (18 mos.).	6,443.81	$44,532,628.99	$36,038,455.30	$8,440,387.91	$ 53,785.78
1898...	6,936.02	39,396,126.41	30,513,553.17	7,045,988.30	1,836,584.94
1899...	7,032.62	40,762,933.47	29,332,964.11	7,241,972.00	4,187,997.36
1900...	7,341.34	46,498,899.04	29,414,427.56	7,345,166.50	9,739,304.98
1901...	7,807.31	54,807,379.78	34,502.039.87	7,830,810.83	12,474,529.08
1902...	7,855.38	60,275,944.33	36,272,432.45	8,438,985.00	15,564,526.88
1903...	7,965.13	63,668,390.99	40,635,576.48	9,134,485.24	13,898,329.27
1904...	8,179.59	69,419,975.41	44,641,434.10	9,418,770.00	15,359,771.31
1905...	8,305.40	69,189,739.65	47,835,883.50	9,611,510.09	11,742,346.06
1906...	8,433.99	79,390,749.05	51,035,355.71	10,622,184.22	17,733,209.12
1907...	9,273.15	94,436,574.68	61,779,916.16	11,487,934.70	21,168,723.82
1908...	9,415.01	91,289,770.61	65,031,582.67	12,579,301.77	13,678,886.17
1909...	9,794.86	95,424,091.89	61,458,019.13	13,548,081.93	20,417,990.83
1910...	9,916.33	107,543,250.16	75,133,314.54	11,984,151.36	20,425,784.26
1911...	10,350.13	109,772,481.69	75,689,094.83	12,712,319.31	21,371,067.55
1912...	10,627.92	110,322,328.13	77,001,227.38	13,660,859.50	19,660,241.25
1913...	10,750.31	119,411,875.94	83,432,816.21	13,825,325.40	22,153,734.33
1914...	10,908.52	113,284,122.98	80,213,746.06	12,886,412.23	20,183,964.69
1915...	11,114.52	120,662,737.93	83,746,128.92	12,785,747.10	24,130,861.91

The following statement shows the gross operating revenues of the System (exclusive of income from other sources) per mile of road operated for each fiscal year since July 1, 1896:

Year Ending June 30.	Gross Operating Revenues.	Average per Mile of Road.
1897	$30,621,230.10	$4,752.04
1898	39,214,099.24	5,653.69
1899	40,513,498.63	5,760.80
1900	46,232,078.23	6,297.49
1901	54,474,822.61	6,977.41
1902	59,135,085.53	7,527.97
1903	62,350,397.28	7,827.92
1904	68,171,200.18	8,334.31
1905	68,375,837.25	8,232.70
1906	78,044,347.25	9,253.55
1907	93,683,406.91	10,102.65
1908	90,617,796.38	9,624.82
1909	94,265,716.87	9,624.00
1910	104,993,194.67	10,587.91
1911	107,565,115.62	10,392.63
1912	107,752,359.91	10,138.61
1913	116,896,251.98	10,873.75
1914	111,109,769.86	10,185.60
1915	117,665,587.46	10,586.65

The following statement shows the development of the freight and passenger revenues of the System since July 1, 1896:

Year Ending June 30.	Freight Revenue.	Passenger Revenue.
1897	$22,067,686.77	$5,574,288.31
1898	28,588,716.76	7,347,361.59
1899	29,492,586.65	8,126,141.85
1900	33,729,332.83	9,334,661.57
1901	39,052,557.43	11,678,017.25
1902	41,815,607.05	13,439,384.57
1903	44,622,438.71	13,469,985.78
1904	47,762,653.23	15,433,773.63
1905	47,408,982.36	16,045,380.27
1906	54,598,902.82	18,013,988.56
1907	65,500,309.42	21,171,629.08
1908	61,848,638.51	21,643,427.49
1909	64,212,638.10	22,734,505.32
1910	71,194,055.59	25,437,181.98
1911	71,787,200.89	27,204,867.66
1912	71,529,574.67	27,453,525.41
1913	78,190,923.18	29,425,922.44
1914	73,638,388.01	28,497,232.68
1915	80,504,393.33	27,823,063.87

PROPERTY INVESTMENT AND RATE OF RETURN.

The development of the Company's business and of its efficiency have been due principally to the very large expenditures (over $308,000,000) which have been made in the extension and improvement of the property since January 1, 1896. In order to make such expenditures, your Company has raised since 1896 over $218,000,000 of "new money" by the sale of bonds which are now outstanding or which (in the case of many of the Convertible Bonds sold) are represented by Common Stock now outstanding.

The following statement shows, for each year, the amount of investment, the amount of net income applicable to bond interest, dividends, improvement of property and strengthening of credit, and the rate of return which such net income represents on the amount of the investment.

Year Ending June 30.	Property Investment.*	Income Applicable to Bond Interest, Dividends, Improvement of Property and Strengthening of Credit.†	Per Cent. Income of Property Investment.
1896 (6 months)	$372,104,262.77	$2,432,870.06	.65
1897	387,957,477.68	6,070,364.45	1.57
1898	392,169,842.02	8,871,947.26	2.26
1899	399,527,444.30	11,409,315.36	2.86
1900	407,187,811.22	17,064,850.91	4.19
1901	419,541,440.17	21,196,714.38	5.05
1902	439,911,035.33	23,921,018.14	5.44
1903	454,290,057.89	23,032,814.51	5.07
1904	466,273,139.34	24,778,541.31	5.31
1905	473,020,998.79	21,353,856.15	4.51
1906	496,782,342.35	28,355,393.34	5.71
1907	519,004,129.48	32,724,274.07	6.31
1908	541,727,328.96	25,633,510.34	4.73
1909	548,251,270.97	33,523,437.28	6.11
1910	585,948,031.56	32,387,712.39	5.53
1911	620,833,307.37	34,102,511.86	5.49
1912	635,182,282.35	33,321,100.75	5.25
1913	657,128,078.35	36,078,744.55	5.49
1914	671,814,299.94	33,070,376.92	4.92
1915	683,855,314.09	36,928,030.11	5.40
Annual Average	$508,625,494.75	$24,936,276.11	4.90

* The amounts above shown as "Property Investment" do not include anything for necessary working capital such as materials and supplies and cash. Ordinarily such necessary working capital considerably exceeds $35,000,000.

In the years 1901 to 1908 the "Property Investment" was reduced by "writing off" sums aggregating $21,066,685.78, which sums are excluded from the "Property Investment" as above stated.

The figures for the years 1910 to 1914, inclusive, are not the same as shown in the corresponding table of annual report for the previous year, but are revised to conform to the Interstate Commerce Commission's classification of "General Balance Sheet Accounts," effective July 1, 1914.

† The "Income" shown above is determined after allowing for adjustments made through profit and loss.

The striking fact emphasized by the foregoing statement is that the earnings on the entire investment are now not much more than five per cent.

per annum, and it must be borne in mind that of these earnings it is necessary to appropriate a considerable amount each year for additions and betterments to preserve the Company's credit.

The ability of your Company, under the conditions which this statement exhibits, to pay six per cent. on the common stock, is due to the fact that it pays an average of only slightly more than four per cent. on its bonded debt, much of the bonded debt having been created when money could be obtained at or near four per cent.

CAPITAL STOCK AND FUNDED DEBT.

The outstanding Capital Stock (deducting stock in treasury) on June 30, 1914, consisted of:

Common	$195,811,500.00	
Preferred	114,173,730.00	
		$309,985,230.00
Issued during the year:		
Common Stock issued in exchange for Convertible Bonds retired		4,678,000.00
Capital Stock outstanding June 30, 1915:		
Common	$200,489,500.00	
Preferred	114,173,730.00	
		$314,663,230.00
The outstanding Funded Debt of the System (deducting bonds in the treasury) amounted on June 30, 1914, to		$313,193,648.50
The following changes in the Funded Debt occurred during the year:		
Obligations Issued:		
Convertible 4% Bonds	$ 977,000.00	
Rocky Mountain Division 4% Bonds	3,000,000.00	
California-Arizona Lines First and Refunding Mortgage 4½% Bonds	10,866.90	
		3,987,866.90
Obligations Purchased or Retired:		
Serial Debenture 4% Bonds	$5,000.00	
Convertible 4% Bonds	4,678,000.00	
California-Arizona Lines First and Refunding Mortgage 4½% Bonds	9,733.00	
Chicago & St. Louis Ry. Co. First Mortgage 6% Bonds	1,498,000,00	
Funded Debt Matured Unpaid included in General Balance Sheet under "Current Liabilities"	15,500.00	
		6,206,233.00
Decrease of Funded Debt		$ 2,218,366.10
Total System Funded Debt outstanding June 30, 1915		$310,975,282.40

Interest charges for year ending June 30, 1916, will be approximately $12,678,840, or an average monthly charge of about $1,056,570. In making this approximation, exchanges of Convertible Bonds for Common Stock made since June 30, 1915, aggregating $2,007,000, are considered.

TREASURY.

Neither this Company nor any of its auxiliaries has any notes or bills outstanding.

The Company held in its treasury on June 30, 1915, $21,186,791.95 cash, and had available $5,278,000 General Mortgage Bonds, including bonds not yet certified by the Trustee. The Company also has in the treasury unpledged a large amount of stocks and bonds of other companies, of which part are carried in the balance sheet as Investments and part are included under Railroads, Franchises and Other Property.

During the year $977,000 of Convertible Four Per Cent. Bonds, which formed part of the Company's treasury assets, were sold for cash, realizing $997,702.50.

FUEL RESERVE FUND.

The fund has been increased during the year by appropriations of income, as follows:

Amount of credit of Fund June 30, 1914	$1,778,332.02
Added during the year	54,502.78
In Fund June 30, 1915	$1,832,834.80

MINKLER SOUTHERN RAILWAY.

This line, from Minkler to Exeter, California, aggregating, with two short branches, 43.71 miles, was completed and opened for traffic on October 1, 1914. An extension, from Exeter to Lindsay, a distance of 6.95 miles, has since been constructed and will be placed in operation October 1, 1915.

OKLAHOMA CENTRAL RAILROAD.

This line, extending from Chickasha, Oklahoma, to Lehigh, Oklahoma, a distance of 133 miles, crossing your main line at Purcell and Byars, was leased by your Company effective August 1, 1914, for a term of five years, and has since that date been operated as a part of its System. The line serves a fairly good agricultural country, but the main purpose in leasing it was to secure coal from the Lehigh fields for use on the System and to permit of supplying the demand for coal at points in northern Texas.

OIL FIELDS & SANTA FE RAILWAY.

This company was formed to acquire certain lines extending from Cushing to Pemeta, Oklahoma, and from Jennings to Oilton, Oklahoma, tapping the so-called Cushing Oil Field, which is an important source of supply for fuel oil. A line from Pemeta to Oilton, connecting the railroads purchased, and an extension from Pemeta to Drumwright are new under construction. The lines acquired, together with those now being built, will aggregate about 27 miles of railway, which, upon the completion of construction, will be operated, under lease, by your Company as a part of its system, and will, it is believed, make a valuable feeder to your main line, with which it connects at Cushing.

OAKLAND WHARF PROPERTY.

The facilities on your Company's water frontage at Oakland, California, referred to under the above caption in the last annual report, were placed in operation July 1, 1915, though not fully completed.

ROCKY MOUNTAIN & SANTA FE RAILWAY.

Reference was made in the last annual report to an agreement with the St. Louis, Rocky Mountain & Pacific Company, under which your Company took possession of this line (then known as the St. Louis, Rocky Mountain & Pacific Railway) on August 1, 1913, under a certain contract of purchase. The conditions of the purchase contract have been met and $3,000,000 of Four Per Cent. Rocky Mountain Division Bonds have been issued in acquisition of the stock and indebtedness of the Rocky Mountain & Santa Fe Railway Company, which owns this line; and the line has been leased to your Company.

NORTHWESTERN PACIFIC RAILROAD COMPANY.

Track laying on the line of this Company (whose capital stock is owned one-half by your Company and one-half by the Southern Pacific Company) from Willets to Shively, a distance of 105.64 miles, has been completed, and the line was placed in operation on July 1, 1915. This construction closes the gap in the mileage and has made possible the establishment of through train service between Eureka on the north and San Francisco Bay on the south.

UNION PASSENGER STATION, KANSAS CITY.

The new facilities constitute one of the largest and most complete passenger terminals in the country and represent a very large investment. The heavy fixed charge which this investment entails and the maintenance and operation of these extensive facilities place a large expense upon the Kansas City railroads, all of whom are using the new station; however, the new facilities are a great accommodation to the public and, of course, materially improve operating conditions at Kansas City.

TAXES.

Instead of showing the customary large increase, the fiscal year just closed shows a decrease in taxes of $28,268.53. The tax accruals for the fiscal year ending June 30, 1914, were $5,525,585.30, while the accruals for the fiscal year ending June 30, 1915, were but $5,497,316.77. However, information so far received pertaining to assessments and rates for the present fiscal year indicates the decrease was temporary only and that we will this year show another substantial increase.

In the report of last year your attention was called to the alarming growth of public expenditures, and the fear was expressed that expenditures for good roads were likely to assume large proportions. States are vying with states, and counties with counties, and the worst fears of a year ago are being realized. Road improvement and construction projects are approved and bond issues voted with but little regard to the ability of the taxpayers to bear the burden and with even less consideration of the utility and permanency of the roads. Yuma County, Arizona, well illustrates the recklessness with which people are now spending money. This county with a population of but 7,730 and but little wealth other than railroad property and having a bonded indebtedness of $138,791 has just approved a bond issue of $500,000 for the improvement of its highways.

Your officials are doing everything in their power to check the unwise and improper expenditure of public funds by arousing the taxpayers and by encouraging associations of taxpayers to fight for efficiency and economy. Their efforts have generally borne good fruit and encourage them to carry on the struggle.

REVISED ACCOUNTING RULES OF THE INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission issued, effective July 1, 1907, its first classifications, pursuant to the Act to Regulate Commerce, as amended, with the purpose of establishing a uniform system of accounts for steam roads. These classifications related to operating revenues and expenses, expenditures for land and equipment, and locomotive, car, and train miles; later these were followed by instructions pertaining to income, profit and loss, and balance sheet accounts. These classifications, which had been under review for a considerable period, were revised and reissued effective July 1, 1914. Certain expenditures which formerly at the option of the carriers were chargeable to Operating Expenses, are, under the revised classifications, obligatory charges to Capital Account. As a result of these changes the operating expenses of your Company for the year covered by this report were relieved of charges aggregating upwards of $600,000, with corresponding increase in the charges to Additions and Betterments as compared with what they would otherwise have been. The greater part of this amount represents transportation charges on men employed and material used in improvement work, increased weight of second-hand rail, and necessary fastenings and appurtenances applied during the year in track renewals. The revised classifications also account for the change in the form of the general balance sheet as shown on pages 26 and 27 of this report.

GENERAL.

The year has been the largest as to earnings, both gross and net, in the history of the Company. Two reasons contributed mainly to this result, viz.: the unprecedented wheat crop of Kansas and the largely increased yield of agricultural products of all kinds in the so-called "Plains Country" in Western Texas and Western Oklahoma. These two items were more than sufficient to overcome a falling off of $1,304,472.05 in net revenue of the lines west of Albuquerque.

The wheat of Kansas and Oklahoma was largely exported via Galveston, thus giving your properties the longest possible haul and the largest possible earnings, and this has created so marked an improvement in business of your Texas lines as to make their net earnings much more than ever before.

The Panama-Pacific Exposition at San Francisco and the Panama-California Exposition at San Diego have created some passenger business, but at such low rates as to afford little if any profit.

Relations with the general public, especially that portion residing along the line, are quite satisfactory, but contest is being made as to rates in various states before both commissions and courts. There is little demur to the proposition that the railroads need more money, but each class of shippers is firm in the view that the increase should not come from it.

The general merchandise rates all over the country (now lower than anywhere else in the world) could be doubled and the ordinary living expense of each family would be so little increased that the head of the family would not know of this advance unless somebody told him. A large part of the trouble about rates comes from certain classes of middle men who contribute little to the prosperity of the country, but who are well organized and consequently influential.

It is too early to measure accurately the effect of the Panama Canal. But it is evident that the loss of revenue on that account is very substantial and already it probably is considerably in excess of $1,000,000 per year.

Governor John G. McCullough, a director of this Company, passed away on May 29, 1915. His sound judgment and wide experience in railroad work, as well as his activities in public life, enabled him to render most valuable service to the Company nad his associates on the Board. His familiarity with the affairs of the Company and conditions in its territory gained from frequent trips over the property testified to the responsibility he felt was attached to his directorship. It is proper, therefore, that there should be given place in this report for this expression of sorrow for the great loss the Company has sustained by his death.

Your Directors are pleased to record their appreciation of loyal and efficient service by officers and employes.

EDWARD P. RIPLEY,
President.